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PATRICK M. SYNGE, M.A., F.L.S.

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NOTICE TO BINDER

Volume LXXIII has been issued in twelve parts, consisting of the "Journal" proper, paged with Arabic figures, and "Extracts from the Proceedings," paged with Roman figures, in Parts 1-10 (inclusive) and 12. The title and contents should be placed first, and be followed by the twelve parts of the "Journal" proper, with the illustrations in the centre in each case, and then the eleven parts of the "Extracts from the Proceedings."

JOURNAL OF THE ROYAL HORTICULTURAL SOCIETY

Vol. LXXIII

Part I

January 1948

THE SECRETARY'S PAGE

Subscriptions, 1948—The Secretary desires to remind Fellows and Associates that all annual subscriptions fall due on January 1, 1948. It would help the office staff to deal with the extra work entailed in the distribution of annual tickets if remittances were sent to this office as early as possible in the New Year.

Annual Meeting—The Annual Meeting to receive the Report of the Council for 1947 and a statement of accounts for that year will be held at 3 P.M. on Tuesday, February 17, in the Lecture Room of the New Hall; there will also be a Show on that and the following day.

Wisley Gardens—The attention of all Fellows is drawn to the fact that until the end of March, the Wisley Gardens will be closed on Sundays and open only on weekdays.

How to get to Wisley—Fellows and Associates desiring to reach Wisley from London are reminded that the simplest way is now by the Green Line Coach which leaves Upper Regent Street, off Oxford Circus, at 7, 27, and 47 minutes past the hour *en route* for Guildford. The conductor will stop the coach, on request, at the turning on the Portsmouth Road which leads to the Gardens. An alternative route is by train from Waterloo to Kingston and thence by the Guildford bus, No. 215, which leaves the bus station, about one minute's walk from Kingston railway station. For particulars with regard to the buses, inquiries should be made at the London Passenger Transport Board, 55 Broadway, London, S.W. 1 (Tel. ABBey 1234). For the times of trains from Waterloo the current time-table should be consulted or inquiries made at Waterloo Station (Tel. WATERloo 5100).

Wisley request for Plants—The Director of the Society's Gardens at Wisley is anxious to obtain the following species of *Campanula*:—

C. abietina, *C. epigaea*, *C. Robertiana*, *C. calcicola*, *C. crenulata*, *C. chrysopleuifolia* and any of the *rupestris-tomentosa* group. If any Fellows have these species and would be willing to spare plants or seeds

for Wisley, the Director of the Gardens would be most grateful if they would kindly get in touch with him.

The Society's Examinations—Candidates who wish to enter for the Society's examinations in Horticulture in 1948 are again reminded that the closing dates for entry forms are as follows:—

General Examination in Horticulture and General Examination in Horticulture for Juniors—Monday, January 19.

Examination for the National Diploma in Horticulture (Preliminary and Final) and N.D.H. (Hons.)—Monday, February 2.

Examinations for Teachers of School Gardening (Preliminary and Final)—Friday, April 30.

Boron Agricultural Bureau—The Boron Agricultural Bureau regrets to announce that its work will be brought to a close at the end of December, 1947. Its comprehensive collection of literature on the uses and functions of boron in agriculture, which has been assembled during the last eleven years, will be presented to the Library of Rothamsted Experimental Station, where it will be available for consultation.

Kindred Societies—We are informed by the Alpine Garden Society that its London Shows this year will be held on the following dates:

Spring Show, March 23 and 24.

Late Spring Show, May 4 and 5.

Autumn Show, September 7 and 8.

The two latter Shows will be held in conjunction with the Royal Horticultural Society's Fortnightly Shows.

Publications—Owing to the November Budget and a consequent increase of purchase tax, the price of the R.H.S. Diary had to be increased to:—

In pluviusin, without pencil 3s. 4d.

In Morocco Leather with loop for pencil 6s. 11d.

Refills 2s. 10½d. (All post free.)

Fellows who have ordered copies prior to the Budget and have sent their remittances at the old rate are requested to forward the difference to the Society's Offices.

WISLEY IN JANUARY

A VISIT to Wisley at this period of the year is always liable to be curtailed by the weather, and should this month prove a repetition of January 1947, the days suitable for walking round the Gardens will be very limited. Generally, however, a few days occur in the latter part of the month which seem to herald the spring and wake to new life our early-flowering trees and shrubs.

Should the weather be severe the very varied collection of flowers in the glasshouses can be inspected without battling with the elements and with more leisure than is possible when the outdoor displays are in full bloom.

Planted against the south wall of the Laboratory near the main gate are several clumps of the Algerian *Iris unguicularis* (*I. stylosa*) one of the most useful of all winter-flowering herbaceous perennials. Grown in well-drained sandy soil to which a little lime has been added, in a position receiving maximum sunlight, this *Iris* will produce a succession of blooms from late November until February. For house decoration the flowers should be cut while still in bud, when they will open perfectly in a warm room.

In the Half-hardy House most of the plants mentioned last month are still in flower. *Lithospermum rosmarinifolium* is a particularly valuable winter-flowering shrub, unluckily not hardy in the open at Wisley; its vivid blue flowers are produced for many months in succession when planted under glass with only sufficient heat to exclude frost.

A few pale blue blossoms are still appearing on *Aster Pappi*, while a new arrival is the small, white, fragrant blossom of *Narcissus dubius*. Several of the succulents planted here are of interest, while silver foliage plants are also much in evidence, particularly a fine specimen of *Leucadendron argenteum* and smaller plants of *Helichrysum plicatum* and *Achillea ptarmicaefolia*, both often used for their foliage colour in the bedding schemes of our public parks.

The Temperate House is well stocked with flowers at this season, including the "Mimosa" *Acacia dealbata* and the darker blooms and finely cut grey leaves of *A. Baileyana*, both rather too rapid in growth for the average greenhouse, but easily propagated and well worthy of replacement as the older specimens outgrow their quarters. A contrast is provided by *A. alata* which produces the same type of fluffy yellow flowers from leafless green-winged stems. *Camellia magnoliaeflora*, with long petalled pale pink flowers, forms a large bush on the centre bed. One of the finest varieties, it is seen at its best only under glass as the blossoms bruise very easily in the open. Other Camellias growing in pots on the side staging include several of the hybrids *C. saluenensis* × *C. japonica* with single pink flowers and golden stamens; it is hoped that these will flower freely in the open at Wisley, when they are sufficiently large to be planted in their permanent positions.

Several of the larger specimens of *Epacris* present a striking contrast with long spikes of white and pink tubular flowers arising from amongst the small, leathery, dark green leaves, while a number of "Cape Heaths" and *Correas* are also in full flower. On the south end of the centre bed a plant of *Salvia rutilans* has been producing its 1 inch long, crimson-scarlet, flowers in loose spikes since November, while nearby *S. leucantha*, once a more widely grown pot plant, carries stouter spikes of silver and mauve blossoms, enhanced by the grey-green leaves with their densely hairy, silver, under surfaces.

Another plant growing with great vigour near the centre of the house is *Jacobinia pauciflora* (*Libonia floribunda*) with neat Box-like leaves and small orange-scarlet flowers, very freely produced during the winter months. It is equally successful as a pot-plant, requiring only the minimum amount of heat to give a bright and continuous display during the duldest months of the year.

The Trial House is packed to capacity with a trial of *Primula malacoides*, a very popular, easily grown member of this great genus which has been improved during recent years by several of our leading seedsmen. From the light mauve, narrow-petalled form originally introduced have been evolved varieties with larger broad-petalled flowers, in many shades from deep carmine-pink to pure white. Most of these should be showing their first flowers towards the end of the month.

Leaving the glasshouses, if the weather is suitable we may continue our walk by way of the Award of Garden Merit Collection where several of our most reliable winter-flowering shrubs are well represented. *Viburnum fragrans*, often mentioned in previous notes, continues to produce its pale pink blossoms during every spell of mild weather. Small plants of *Jasminum nudiflorum*, probably the widest planted of all winter flowering shrubs, open their bright yellow flowers whenever conditions permit; trained on a south or west wall this popular Jasmine seems to thrive equally well in town or country and its abundant blossoms are often in demand for room decoration.

Nearer the pond is a fine specimen of the most striking of all our January flowering shrubs, *Hamamelis mollis*, the Chinese Witch Hazel; it was first introduced in 1879 to MESSRS. VEITCH'S Nursery at Coombe Wood, but it was a long time before it became well known. Here it thrives both in this collection and in the thin woodland of the Wild Garden, never failing to produce its yellow flowers in great abundance, and to all appearances undamaged by any frosts. Last year the flowers first appeared during the last few days of the old year and by the middle of this month the bushes were in full flower.

Seven Acres is almost stripped of berries; only the orange clusters of the dioecious *Hippophae rhamnoides* and a few of the later ripening Cotoneasters remain. But the winter sun enhances the brightly coloured bark of *Salix vitellina pendula* and *S. daphnoides* and the black and white of the Birch trunks, while the Erica Garden is gay with drifts of *Erica carnea* in many varieties, the hybrid *E. darleyensis*, and, if the winter is kind, the taller growing *E. lusitanica* with white flowers and pink buds above.

Turning into the Wild Garden we see a fine *Hamamelis mollis* and the first flowers open this month on *H. japonica*, while the spear-points of growing bulbs give promise of the flowers to come, and the first flowers are appearing on *Cyclamen coum* and the early flowering forms of *Daphne Mezereum*.

The Rock Garden, owing to its northerly aspect, is often slower than other parts of the Gardens in starting into growth and few flowers are as yet in evidence. As we climb upwards to the Alpine House, a few pans are already in full flower, including *Iberis semperflorens*, a white Candy-tuft from the Mediterranean which always flowers steadily the winter through, and *Ranunculus calandrinoides* with glaucous foliage and large, pink-flushed, white flowers, with golden centres. Numerous bulbous subjects will also be in flower, especially towards the end of the month. Outstanding amongst these are the two early Snowdrops, *Galanthus Elwesii* and *G. latifolius*, the neat-growing pink or white hardy Cyclamens such as *Cyclamen coum*, *C. cilicicum*, the white *C. ibericum album*, and

the outstanding *Scilla Tubergeniana* with lilac blossoms often opening before the flower stems elongate.

Near the Rose Walk beds have been constructed to accommodate a larger collection of the newer Roses, and at the end of the terrace near the Floral Superintendent's house an Elm tree, damaged by lightning some years ago, has been removed to allow a fine view of the large Oak whose width of spread and bole are very striking now the bare branches show stark against the winter sky.

Before descending the steps to the main gate one further shrub is worthy of inspection; on the twin borders leading from the terrace to the glasshouses is a fine plant of *Lonicera fragrantissima*, a semi-evergreen, bushy Honeysuckle producing sweet smelling creamy-white flowers from December to March, which on a still warm day scent the air some distance from the bush.

THE BOTANICAL MAGAZINE

Patrick M. Syngé

MANY Fellows will have noticed the rows of finely bound morocco and calf volumes which face them in a glass case as they enter the door of the Lindley Library. These are a complete set of *Curtis's Botanical Magazine*. In this short article I hope to show something of the romance and history associated with the making of these volumes and their magnificent series of coloured plates. The history is that of plant collecting and from these volumes can be reconstructed the triumphs of plant introduction for the last two centuries. The plants illustrated have a very wide range. In the older numbers the European and South African plants predominate, many having been introduced by early travellers and merchants. During the last century our gardens were enriched by the American plants introduced by LOBB and DOUGLAS and many were figured in the Magazine, while in this century the wealth of Chinese and Tibetan species introduced by WILSON, FARRER, FORREST, KINGDON-WARD and now LUDLOW and SHERRIFF have been figured freely. It is a continuous story, as much alive now as it was two centuries ago, a story which will continue as long as the spirit of adventure remains with our gardeners and botanists. Each plate with its accompanying text takes us on a miniature journey of exploration. Then there is the lesser, but hardly less fascinating history of the founding of the *Botanical Magazine*, the successive struggles of a long line of editors, pre-eminent in the history of English Botany, and the technical craft and accomplishment of a succession of artists and colourists. Throughout its history the Magazine has presented a very happy combination of accurate scientific information and artistic achievement.

The *Botanical Magazine* was founded in 1787 by WILLIAM CURTIS and has been published continuously since then. It is, indeed, the oldest current scientific periodical of its kind with coloured illustrations in the

world, and in the beauty of production and the high standard of its contributions it can claim a unique place.

CURTIS defined the aims of the Magazine as one "in which the most ornamental Foreign plants, cultivated in the open ground, the greenhouse and the stove, are accurately represented in their natural colour . . . a work intended for the use of such ladies, gentlemen and gardeners as wish to become scientifically acquainted with the plants they cultivate." This aim is still maintained, although with more emphasis on hardy plants.

At present each part of the Magazine contains one double plate and ten single plates and four parts will be published during the year. These plates are made from water colour drawings prepared with great care and accuracy by the artists. The plants figured are chosen from the collections at Kew as well as from other famous gardens. It is open, however, to any Fellow of the Society to suggest or offer plants for figuring in the Magazine and such suggestions are welcomed. In normal circumstances, however, a plant once figured will not be figured again unless some new material or factor has been discovered. Notable hybrids, particularly first crosses between species or hybrids of bigeneric origin, are included from time to time.

Each plate is accompanied by a description of the plant, its systematic position, its discovery and its distribution as well as some details of its cultivation in the actual garden where the plant figured was grown.

WILLIAM CURTIS, the founder, was an interesting character. An account of his life and work by MR. J. E. LOUSLEY was published in the *Journal R.H.S.* 71, 98-100, 124-129 (April and May, 1946) in connection with the bicentenary of his birth. A biography of him has also been published by MR. W. HUGH CURTIS of the Curtis Museum, Alton.*

He was the eldest son of JOHN CURTIS, a tanner of Alton. When at school he first showed that passion for plants and insects, which were to form his life work. He was given a plot in his father's garden. MR. HUGH CURTIS records that "Even then his power of observation was acute, for a part of the plot, his father noticed, was occupied by plants which he knew as weeds: these, he ascertained, were not there through sloth or neglect, but, because certain insects and caterpillars were seen to have a predilection for them." Later CURTIS was apprenticed to his grandfather an apothecary in Alton. At this time he formed a close friendship with WILLIAM LEGG an ostler at the neighbouring Crown Inn. LEGG also had a passion for Natural History and it is recorded that there were few wild plants in the neighbourhood that he could not name. Together they roamed the countryside and studied the Herbals of PARKINSON and GERARD. At the age of twenty, his father, possibly disturbed by this association, sent him to London as apprentice to another apothecary, this time in Pudding Lane. He stuck as an apothecary till 1770, although with some deviations towards his own bent of Natural History. MR. HUGH CURTIS records an episode in which MR. TALWIN, his employer at that time, found among CURTIS's papers an engraving of a common nettle for which he had paid no less than *three guineas*. Such "reckless-

* *William Curtis, 1746-1799*. By W. Hugh Curtis. (Warren and Son, Winchester. 1941.)

ness" earned CURTIS a strong talk from his employer but the matter was patched up and when he died a little later, MR. TALWIN left CURTIS his practice. He soon attracted the notice of prominent naturalists of the day, and in 1772 was appointed "Demonstrator of Plants and Praefectus Horti" at the Chelsea Physic Garden. His first large publication with coloured plates was the folio *Flora Londinensis*, but on this he lost money and the work was not completed in his lifetime. In 1787 he started *The Botanical Magazine*, possibly with a view to recouping some of his losses on the *Flora Londinensis*. Each part contained three plates, hand-coloured, and was sold for one shilling. Parts were published monthly and the circulation reached the high level of three thousand, a figure which has seldom been reached since.

The first plate was *Iris persica*, and it is still, to my mind, one of the most delightful ever issued. Unfortunately, although mentioned in PARKINSON'S *Paradisus* in 1628, this is still a rare and difficult plant in English gardens. CURTIS writes: "Its beauty, early appearance and fragrant blossoms, make it highly esteemed by all lovers of flowers; like the hyacinth or Narcissus it will bloom within doors in a water-glass, but stronger in a small pot of sand, or sandy-loam; a few flowers will scent a whole apartment." This was followed by *Rudbeckia purpurea* and the Winter Aconite (*Eranthis hyemalis*) then known as *Helleborus hyemalis*. The first plate of the second part is a charming representation of *Cyclamen coum*. All these early plates are described as "Published as the Act directs by W. CURTIS, Botanic Garden, Lambeth Marsh." CURTIS himself edited and published the *Botanical Magazine* up to the time of his last illness. He died in 1799. On his gravestone was inscribed the following verse, a fitting hope

"While living herbals shall spring profusely wild
Or garden cherish all that's sweet and gay;
So long thy works shall praise, dear Nature's Child,
So long thy memory suffer no decay."

The *Gentleman's Magazine* lamented "Where shall we find his equal in botanical taste and accuracy!"

He was succeeded as editor by his friend DR. JOHN SIMS, whose name appears first on the title page of Volume 15 for 1801. Under him the number of plates was increased to four per part and the price to 1s. 6d. Later eight plates per part were published, and the price rose to 3s. 6d. The number of plates per volume was not, however, constant.

During the period of CURTIS's editorship and during much of that of SIMS, the plates were drawn by SYDENHAM EDWARDS, with the exception of a few drawn by JAMES SOWERBY and eight by MR. SANSOM. SYDENHAM EDWARDS was the son of a Welsh schoolmaster. CURTIS saw some samples of his work, called him to London when quite a young lad and trained him in botanical drawing and painting along his own lines. It was a happy association and EDWARDS stayed with the Magazine till 1815. Many of his original drawings are now in the Kew collections.

The great majority of the plants figured during this period are hardy European plants with a sprinkling of plants from Eastern North America

and from the Cape. These latter increased with the frequent introduction of *Ericas*, *Pelargoniums*, *Mesembryanthemums*, *Gladioli* and other such plants, but a few South American plants were grown and figured at this time such as *Sprekelia formosissima* (Plate 47) as *Amaryllis formosissima*, *Passiflora alata* (Plate 66), and *Fuchsia magellanica* (under the name of *F. coccinea*) (Plate 97). This was then regarded as a stove plant. Even a few plants from Australia, such as *Acacia verticillata* (Plate 110), are figured at this period. Another most charming plate of this time is the pink Moss Rose (Plate 69), and the quality of pinkness in the copy in the Lindley Library seems to have been retained unimpaired. Other plates using more solid colour such as the *Papaver orientale* (Plate 57), have darkened with the passage of time, but there are only a few like this. The first Camellia, a single pink form of *Camellia japonica*, was figured in the second volume as Fig. 42, while the first double folding plate was given in Volume 4 to the magnificent *Strelitzia Reginae* (Plate 119). This plant had only been introduced by SIR JOSEPH BANKS from the Cape of Good Hope in 1773, and it was figured in the *Botanical Magazine* in 1791.

Rivals to the *Botanical Magazine* quickly sprang up. In 1792 was published the first part of ANDREWS' *Botanists' Repository*. SYDENHAM EDWARDS started the *Botanical Register* in 1815, while in 1818, the first volume of LODDIGES' *Botanical Cabinet* appeared. All of these works were similar in arrangement and idea to the *Botanical Magazine*, but none survived beyond the middle of the nineteenth century. By 1827 there were no fewer than ten English serial publications illustrating in colours the cultivated plants of English gardens.

A new series was started in 1815, when SYDENHAM EDWARDS left the Magazine, and another in 1826, when DR. SIMS retired from old age and the editorship was taken over by WILLIAM JACKSON HOOKER, then Professor of Botany at Glasgow, and later (as SIR WILLIAM HOOKER), Director of the Royal Botanic Gardens, Kew. He must have been a man of great energy and character, and under him the *Botanical Magazine* entered a new era. The third series ran from Vol. 54 to Vol. 71 in 1845, when the firm of REEVE BROTHERS (later LOVELL REEVE AND CO.) took over the proprietorship of the Magazine. HOOKER, however, remained as editor, and the Magazine became closely associated with Kew. This association has lasted to the present day, always intimate, but never official. This association was emphasised by the new wording on the title page which has remained essentially the same up to the present day and in the adoption on the title page of the vignette of the Palm House at Kew which still appears.

During the early years of his editorship, WILLIAM HOOKER executed the majority of the plates himself as well as acting as editor and writing the texts. However, he was lucky enough to find a very accomplished apprentice artist in W. H. FITCH, who was the son of a book-keeper in a firm of Glasgow flax merchants and had learnt his drawing in the form of patterns for calico, muslins, etc. FITCH's first drawings appeared in the *Botanical Magazine*, 1834, and from 1845 he was able to combine the positions of artist and lithographer, no mean achievement. The plates undoubtedly benefited from this and his bold colouring and delicate line

has never been surpassed. FITCH worked for the Magazine till 1878, and executed no fewer than 2,800 plates.

SIR WILLIAM HOOKER died in 1865 and was followed as editor by his son, JOSEPH DALTON HOOKER (afterwards SIR JOSEPH HOOKER), who also became Director of the Royal Botanic Gardens at Kew. The period of editorship of the two HOOKERS was a time of great activity in the collection and introduction of plants to England. In 1805 the Horticultural Society of London had been founded and collectors were being sent to various parts of the world, among them DON to West Africa, DOUGLAS to North America, and FORTUNE to China. JOSEPH HOOKER'S own journeys to the Himalayas also belong to this period, and he himself introduced many of the Himalayan *Rhododendron* species and other plants figured in the Magazine. It is impossible here to give any kind of a list of the more notable plates. Each was notable for some reason or other. The first representation of the Lotus (*Nelumbo nucifera speciosum*) appeared in 1806 (Plate 903) and a larger and finer couple of plates appeared in 1842 (Plates 3916-17): *Victoria regia* was figured in 1847 (Plate 4275), a magnificent triple plate. SIR WILLIAM HOOKER wrote of this in probably the longest text of any in the whole history of the Magazine. "It has always been our endeavour to commence a New Year in this Magazine with some eminently rare or beautiful plant; but never had we the good fortune on any occasion to devote a number to a production of such pre-eminent beauty, rarity, and we may add celebrity, as that now presented to our Subscribers; worthy as we have no doubt they will agree with us in thinking, to occupy the entire number." *Magnolia Campbelli* appeared in 1885 (Plate 6793) a very beautiful double plate, and SIR JOSEPH HOOKER was able to write a eulogy of it from first-hand knowledge of the trees in their native habitat.

SIR JOSEPH HOOKER retired from the editorship in 1904 when it was taken over by DR. W. BOTTING HEMSLEY, Keeper of the Herbarium at Kew. DR. HEMSLEY has written a most interesting account of the *Botanical Magazine* and Botanical Literature in England up to that time, and it was reprinted as an introduction to the Index to the Magazine published in 1906. I have freely drawn on it for the compilation of this article as also upon the stimulating account of the Magazine by DR. OTTO STAPF, a later editor, in the R.H.S. JOURNAL (Vol. 51, pp. 29-43, 1926). Since DR. HEMSLEY, the editors have been SIR W. T. THISTLETON DYER, SIR DAVID PRIN, DR. O. STAPF, SIR ARTHUR HILL, and MR. A. D. COTTON. The present editor is DR. W. B. TURRILL, Keeper of the Herbarium at Kew.

Among the artists FITCH was succeeded by MISS MATILDA SMITH, who was the sole artist from 1887 to 1920 and who contributed no fewer than 2300 plates. In the recent period we have the work of MISS LILIAN SNELLING, who has painted some of the most graceful and beautiful plant drawings ever made. Now MISS STELLA ROSS-CRAIG is executing the majority of the plates.

Another interesting character of the Magazine lies in the Dedications. These were inaugurated by SIR WILLIAM HOOKER in the first volume of the Third Series in 1827, which he dedicated to ROBERT BARCLAY of Bury Hill, Dorking, one of the original patrons of the Maga-

zine. Each succeeding volume has carried a dedication to an eminent Botanist or Horticulturist together with a few lines on his work. In 1927, these were collected together into a Centenary Volume by MR. WILLIAM CUTHBERTSON and MR. ERNEST NELMES, which gives a short biography and a portrait of each subject.

In 1922 the publication of the *Botanical Magazine* was undertaken by the Royal Horticultural Society and the Fellows of the Society are the owners of the Magazine, and through the members of the Council, the trustees of a notable and a great tradition. After the 1914-19 war the Magazine passed through difficult times and the former owners were compelled to discontinue publication owing to the increased cost of production. The Magazine was rescued by the action of a few public-spirited men, several of them still members of the Council of the Society, who purchased the Magazine and presented it to the Society. During the second World War and immediately after, the publication of the Magazine again fell into arrears. It was no longer found possible to secure colourists who would be willing and skilful enough to colour the copies of the Magazine by hand, no small task. Through the years the plates of the Magazine had increased in complexity and detail, and the laborious task of hand-colouring had increased accordingly. Consequently, after a prolonged search for colourists, during which the work of no fewer than 100 artists was tested, the Council decided that a mechanical means of colour reproduction was necessary and MESSRS. WATERLOW AND SONS have been entrusted with the work of printing the plates in colour collotype. So great have been the developments in colour printing, that it is estimated that this printing should not fall short of the former hand-colouring method. It will also enable greater numbers to be printed, but necessarily at a much greater cost.

Now that the Royal Horticultural Society has formed a cytological department at their gardens at Wisley, it is intended, whenever possible, that the chromosome numbers of the plants illustrated and described in the Magazine will be given. This is an innovation which will be invaluable to scientists and hybridists all over the world. For the first time in the Magazine, cytological details of the actual plant illustrated will be given opposite the plate, thus helping to establish and fix the identity of the plant.

Necessarily the edition of the Magazine is limited in numbers and previous volumes of the Magazine, and especially complete sets, are now very valuable indeed, as well as being highly treasured possessions. Volume 165 will begin a new series, and in order to simplify reference, the plates will be numbered from No. 1. It is, therefore, an ideal time to begin a subscription to the Magazine. The Magazine is no less than a national tradition and in the words of a former editor it ought to be a matter of national pride to support it, remembering that botanists and gardeners throughout the world have relied now for 160 years on the inspiration and help they have received from the *Botanical Magazine*.

The first part of the new series has just been published. Since it is not possible to give a fair representation of the beauty and craftsmanship of the plates by half-tone reproduction in the JOURNAL, the Committee decided that we should attempt no reproductions to illustrate this

article in the JOURNAL, but small exhibitions of the *Botanical Magazine* will be held in the Hall during the winter months at the Society's fortnightly shows. A full set is available in the Library and a free specimen plate will be sent out with a Prospectus, as long as the supply lasts, to anyone who applies.

SOME MODERN ROSES

Bertram Park, O.B.E.

A FEW fond persons are always deploring the loss of the "Old Roses" those "grand old scented Roses of our grandfathers." Let them pause and consider. Were those old Roses really so outstanding or is it a case of "distance lends enchantment" or, that the old descriptions of those Roses were well enough true in their day, but had no comparison with modern achievement to put them against? STEVENSON'S "Rocket" shocked society by tearing through the countryside at 20 miles an hour, but perhaps the "few fond persons" do not think that the latest oil-fired streamlined G.W.R. masterpiece is any advance on STEVENSON'S "Rocket." There are two reasons for the gradual disappearance of old hybrid roses, (a) that they have deteriorated by vegetative propagation and have lost their original vigour, and (b) that they are superseded by better forms and except as museum pieces are not worth keeping anyway.

The deterioration is very marked indeed a few years immediately after the introduction of some new varieties. In my earlier days among Roses before I gained sufficient experience to select and bud my own plants, there must have been dozens, I almost said hundreds of new varieties which I bought and then discarded as useless, a year or two later. If the new variety has sufficient intrinsic quality and vigour to do well during these first few years, it may settle down to a long life, but inevitably sooner or later a further deterioration sets in until that variety gradually disappears from cultivation. The reason for this first period of deterioration is because the "eyes" of a new variety are valuable and produce the principal financial reward to the raiser. It must be remembered that the production of a distinct and improved new variety takes years of labour and great knowledge and experience. Consequently having been exhibited and received a gold medal or other award there is an immediate demand for it and every available "eye" is sold from that first small stock of plants, whether they are good, bad or indifferent and are taken from stems quite regardless of the quality of the flower which that stem has produced. The weak or bad eyes produce weak and bad plants from which all the eyes are again taken for budding. Result, all those plants are inferior to the original specimens.

I have no doubt that if the nurserymen were to take only the best eyes and only from those stems that have given perfect flowers this highly selective propagation would keep up or even indeed improve on the quality of the original strain. This, however, is quite impossible on a commercial scale in the nurseries, but it has been shown to be true in

private hands. MR. HERBERT OPPENHEIMER, by continuous highly selective propagation over a number of years, has greatly improved the strains of some of the varieties in his glasshouse at Bray, so much so that with some they are almost distinct varieties. In one case his blooms are completely different from the blooms on my plants, yet they come from the same original. He has also some older Roses that are now, with him, as good or better than ever, yet they have disappeared from commercial cultivation, and the majority of gardens.

There is no doubt that the quality of the eye and the stem from which that eye is taken determine the quality of the resulting plant.

The fact is that no Rose of complex pedigree has a life of much more than fifty years. Before the century is out all of them will have died away and new varieties have taken their place. There is a catalogue published by a nurseryman in France in 1820 containing a list of 2,000 cultivated varieties. They are nearly all extinct and there is no advantage in resuscitating them. Of the hundreds of varieties raised between then and the end of the century not more than half a dozen are worthy of modern attention except as curiosities, and how many want to make museums of their gardens? Please understand that my remarks do not apply to the species or near species, or their hybrids, there are few more valuable flowering shrubs for garden decoration than these.

Some of the Gallicas and damask hybrids are very near to their original species parents and still retain their original vigour. Only true species, when self-fertilized, breed true to type, but if self-fertilized seeds of the former garden varieties are sown and grown on, some of the seedlings would come almost true to their parents, but some would have reverted to their grandparents and in a second generation would have mostly reverted to their original species types. Many of these old Gallicas are so closely allied to their original parents that they retain some of their first vigour (but they also retain that characteristic, one full flush of flowering once only a year).

When we come to the so-called Hybrid Perpetuals (which were so rarely "perpetual") of the last century their pedigrees are already very complex and, propagated continuously by vegetative processes, they have gradually degenerated and are to-day, where they survive, but shadows of their original selves. Take 'Roger Lambelin' as an instance of my assertions. When this Rose was introduced about the year 1902 it was the sensation of the show, great globular blooms "such as never had been seen before"(!) so said contemporary descriptions. Tall strong plants making vigorous remontant growth. Can you grow a plant of it like that to-day? No! four years ago I budded it again, but no effort or care in cultivation will make it grow much more than a foot in height with weak straggly stems and thin characterless flowers, but travesties of those shown in 1902. As a variety it is finished; let it rest in peace or remain enshrined in those memories which are sufficiently long, but do not try and grow it in the gardens of to-day.

A very few of those fifty or more years old still retain their vigour, but how rarely do we see even 'Frau Karl Druschki' in a newly budded plant grow into those great bushes or throw those 6 ft. long and $\frac{3}{4}$ inch thick shoots which I remember pegged down across the beds at Wisley thirty

years ago. A few fine old trees of other varieties exist still, and a few magnificent old climbers are still thriving on the walls of old houses, but try to propagate them again and the most endless patience will not reproduce the plants from whence they came. The great DEAN HOLE once said that, "If I for some heinous crime were miserably sentenced for the rest of my life to possess but a single Rose tree, I should desire to be supplied, on leaving the dock, with a strong plant of 'Gloire de Dijon'." He describes one of his trees as having a lateral of one year's growth, which is 19 feet long, and the bole of another tree which is 10 inches in circumference, but yet a few years old only.

What is a newly-budded plant of 'Old Glory' to-day? Have you ever seen a plant not more than a few years old give blooms that the fondest imagination could think were worth the cultivation? What would DEAN HOLE think of 'Gloire de Dijon' to-day?—not much!

Thus is the necessity for the continuous creation of new varieties, new varieties to take the place of the old ones dying out, and not only new varieties, but improved varieties and not only of existing classes but new classes themselves. Thus the Hybrid Polyantha, a comparatively new class, has now firmly established itself as a most desirable garden plant until in course of time some genius will hybridise a new combination of species to oust it from its present universal popularity.

But there is still plenty of room for more of this class of vigorous everblooming garden plants. 'Frensham' from an undistributed polyantha seedling by 'Crimson Glory' is an outstanding gold medal new introduction raised by an amateur MR. A. NORMAN. The young flowers are small and perfectly formed, but soon open out into the loose formation characteristic of its class. By judiciously disbudding the first or centre buds in each group of three, enormous trusses can be obtained on the same stem all in full flush at the same time. The colour is a rich deep scarlet unfading till the flowers drop; few hips are formed so that little attention is needed and when one truss fades another is preparing to take its place. Hard pruning will keep the plants dwarf, but with light pruning they will grow to 3 feet high and form a dense prickly hedge (Fig. 5). 'Ena Harkness' also raised by MR. NORMAN ('Southport' × 'Crimson Glory') is a front rank Gold Medal Hybrid Tea, and by Hybrid Tea I mean that it has almost pure descent from the original China species with very little of that infusion of Persian yellow blood that has brought so much beauty but so much trouble to our present Rose gardens. The pedigree of 'Southport' the seed parent of 'Ena Harkness' is not recorded, but I do not believe such a brilliant scarlet could be created from the long line of bluish-crimsons without the addition of a little yellow. The alternate severe frosts and thaws of last winter destroyed many good plants of all varieties in my garden, but of thirty plants of 'Ena Harkness' I lost not a single one. It is a strong upright and perfectly hardy bedding and garden Rose which I can confidently recommend to all (Fig. 4). From the *same seedpod* came 'Red Ensign,' a very large deep crimson, the crimson of the China Rose, of exhibition form and size, and what a scent! Another fallacy of "the few fond persons" is that modern Roses have lost their scent. The fact is that there is a far higher percentage of scented Roses in our gardens

to-day than there ever were in the gardens of the nineteenth century. True in 1900 the genius of PERNET DUCHER evolved the beginnings of that new class, later named Pernetiana, of pure yellows, oranges, scarlets and flame colours which has brought such sunshine into our gardens. But also brought those characteristics of the Persian Yellow, lack of scent and some lack of hardiness. Would we sacrifice all the glorious colours of our rose beds to-day on account of the temporary loss of some perfume between 1900 and 1920? Since 1920, scent has gradually been bred back into our new Roses of yellow colouring, and to-day it is a practical impossibility for any scentless Hybrid Tea or Pernetiana Rose to attain to the Gold Medal of the National Rose Society and be introduced to the world with that honour to recommend it. The hybrid Polyanthas and Wichuraianas as classes have not yet acquired scent which is temporarily excused, and one of these classes must have quite exceptional merit in other qualities to receive the premier award. 'William Harvey' and 'Margot Anstis,' both with Certificates of Merit and from the same stud, are especially recommended to exhibitors, that is to say that under good cultivation they produce large perfectly-shaped Roses and are very free flowering, but require a little more care and attention than those commoner types, though of course all good Roses deserve that care and attention not always invariably their lot. 'Margot Anstis' is an even-toned soft satiny pink and 'William Harvey' a deep scarlet.

BEEES of Liverpool have raised many good Roses. In the last few years they have received certificates of merit for 'Doris Grace Robinson' ('Swansdown' × 'McGredy's Yellow') 'Raffles Bruce' ('Mrs. Sam McGredy' × 'Aureate') and 'Mabel Francis' ('Leading Lady' × 'Southport'). The last is a soft self pink large and well formed; I do not know why it did not receive the gold medal, the voting must have been close. I have had it in my garden for two years and like it well enough to be increasing my stock of it (Fig. 6). 'Doris G. Robinson' is an ivory white with the long petals reminiscent of 'McGredy's Ivory,' and 'Raffles Bruce' is a rich orange.

One of the finest pink Roses ever sent out is undoubtedly 'The Doctor'; it was distributed in England in 1938 on the margin of the period set me for review, but it is a great Rose and must be included. It was raised by HOWARD AND SMITH of California and named by them after one of the most famous men in the Rose world of America, DR. HORACE MCFARLAND; his full name had already been given to another Rose so this had to be abbreviated to 'The Doctor,' but everyone knew who was the Doctor. It is a glorious rich deep pink, unfading until the petals drop, and has the strong perfume that one senses before one comes near to the plant. A very large Rose but not too full to be unable to open its long petals in any weather. I have grown it since before its general distribution and it has always been a delight. The plants have not always been as strong as I should like, but I am budding a new bed next year on polyantha simplex stock which may suit it better than has canina.

'Poinsetta,' also raised by HOWARD AND SMITH, is a Rose that has been very highly spoken of in America, and has received the award of the American Rose Society's certificate, and the Award of Merit of the

R.H.S. in this country. It is described as "definitely the most brilliant scarlet Rose ever produced, well named, as in colour it is similar to the plant of that name. The buds are of ideal form, long and pointed, on long stems and it is an excellent grower." With the recommendation from America it should be well worth a trial by those looking for bright colour in the garden.

'Charles Gregory' was raised in Holland and named after the founder of the firm of C. W. GREGORY AND SON. It is a medium-sized decorative of bright mixed tones of red and yellow, of good shape and on long stems and has received the Certificate of Merit of the National Rose Society. I have seen it growing in the nursery and have been sufficiently attracted to it to bud a quantity in my own garden to bloom next year (Fig. 3). 'Spek's Yellow' is a medium-sized rich yellow, on long stems and is undoubtedly a good Rose for cutting. It was very well shown at the Chelsea Show and made a good impression; there is room for a good decorative yellow such as this, and I think it will fill a want.

F. MEILLAND of Tassin, Lyons, is one of the most successful breeders in France and he has raised a masterpiece which he named after his wife MDME. A. MEILLAND. This has already been "out" in America for two years, and has been re-named in the States 'Peace.' It was shown here for the first time this autumn under that name and received the highest distinction of the Gold Medal of the National Rose Society; at the same Show one of the blooms exhibited was also selected to receive the medal as the best individual bloom in the Show (Fig. 2).

'Peace' is perfectly formed, very large, of pale lemon colour and with the margins and edges of the petals delightfully tinted with cerise pink. I have seen it growing in the nurseries and the plants are strong and healthy with no trace of any disease. I was particularly impressed with the large number of blooms per plant, exceptional when they are of such large size. There are several more of the Meilland productions queuing up for presentation. Among the Roses introduced in the last few years the following should be noted: 'Lady Trent' (PEDRO DOT, 1939), coppery orange, strong stems and glossy foliage, pedigree not given, but probably from 'Mrs. Sam McGredy.' Awarded Certificate of Merit of National Rose Society. 'Mary Wheatcroft' (ROBINSON, 1943) of similar colouring and probably another seedling from 'Mrs. Sam McGredy.' 'R. S. Hudson,' introduced in 1945, is of golden maize colour, of good form and high-pointed centre, awarded Certificate of Merit by the National Rose Society and the Award of Merit of the R.H.S. This is a Rose which should do well, but I think that sufficient consideration is still not being given to the names of new Roses by their sponsors. 'Arthur J. Taylor' (1946) is a very large Rose of carmine colouring, a vigorous growing garden Rose and a variety for the exhibitor of specimen blooms in showboxes. Certificate of Merit National Rose Society and Award of Merit R.H.S.

'Wheatcroft's Golden Polyantha,' outstanding as the first true yellow in its class, has large trusses of flowers throughout summer and autumn and has beautiful shining foliage. Certificate of Merit in 1945.

The miniature China Roses are again receiving attention and make charming subjects as pot plants or in the rock garden. 'Josephine Wheat-

croft' (PEDRO DOT, 1947), Certificate of Merit, has tiny perfectly-formed flowers of buttercup yellow on compact bushes about 16 inches high, and continuously in bloom the whole season. 'Baby Crimson' (PEDRO DOT, 1946) is another, a miniature plant less than 9 inches high with trusses of tiny blooms "glowing like rubies above the mid green foliage." On the other extreme is a 6 foot shrub Rose called 'Nevada,' a Hybrid Bracteata (PEDRO DOT, 1945) having its main flowering in May when it is covered with masses of creamy buds flecked with pink.

Another amateur who is doing well as a successful hybridizer is NORMAN FLETCHER of Faringdon. 'C. A. Fletcher' is a large clear crimson of good form which won a Certificate at the Summer Show 1947. Among the JACKSON AND PERKINS American Roses, the latest is a really beautiful Hybrid Polyantha named 'Fashion' which is pure salmon colour, a distinct and most attractive novelty shown for the first time at the National Rose Society's 1947 Autumn Show. I shall certainly want this when it is available. 'Poulsens Bedder,' another Hybrid Poly, is already well known, a bright pink semi-double extremely free-flowering bedding Rose. E. B. LE GRICE, of North Walsham, has raised a number of Hybrid Polyantha Roses including 'Dainty Maid' which is one of the best, and has continued his work in this now very important and popular class. 'Dusky Maiden' is a large semi-double deep red shaded maroon with golden anthers; it is particularly notable in being scented. All the earlier Hybrid Polyanthas were completely lacking in this quality, as inherited from its species ancestor, and the breeders have had particular difficulty in introducing it. 'Dusky Maiden,' a ('Daily Mail' scented \times 'Etoile de Hollande') seedling \times 'Else Poulsen,' is a good Rose.

DE REITER, one of the outstanding breeders in Holland, has raised a number of very fine dwarf Polyanthas of brilliant colours, but has now made a great advance in producing a small-flowered seedling with the growth and habit of the more vigorous Hybrid Polyantha class, and has named it 'de Reiter's Herald' as the forerunner of a new type. The very large trusses of bloom are bright scarlet shaded orange, and make a wonderful effect when massed as a bedder.

'Fantasia' is another attractive new golden yellow Rose which received a Certificate of Merit, raised by DICKSONS of Newtownards, Northern Ireland. Though I have not grown it myself, it is said to be exceptionally free-flowering and a good grower by those who have seen it growing in the nurseries.

The pedigree illustrated traces back the parentage of three outstanding new red Roses to four original species (page 17).

It is noteworthy that the pollen parent in every case is red, supporting the theory that the male parent influences colour. The *R. chinensis* species is a purplish-pink or light crimson as is also the *R. damascena*, and this bluish or purplish tint persists until it is met by the descendant of *R. lutea* when 'Crimson Glory' becomes more scarlet. The parentage of 'Southport' is not published, but the yellow colouring at the base of the petal indicates without any doubt a strain of *R. lutea* descent. When this second influx of *lutea* strain meets 'Crimson Glory' the result is the almost pure scarlet of 'Ena Harkness.'



Colour photograph by N. K. Gould

FIG. 1.—The Herbaceous Borders at Wisley, 1947



Photos R. A. Malby

SOME MODERN ROSES

FIG. 2 Rose 'Peace', Gold Medal National Rose Society, 1947 (See p. 15)



SOME MODERN ROSES

FIG. 3 —Rose 'Charles Gregory' (See p 15)



Photo R 4 May 16

FIG. 4. Rose Ina Hurlness (Sec. 1, 13)



SONII. MODERN ROSES

FIG. 5. Rose Frensham (Sec. p. 13)



FIG 6 Rose Mabel Francis (See p 14)

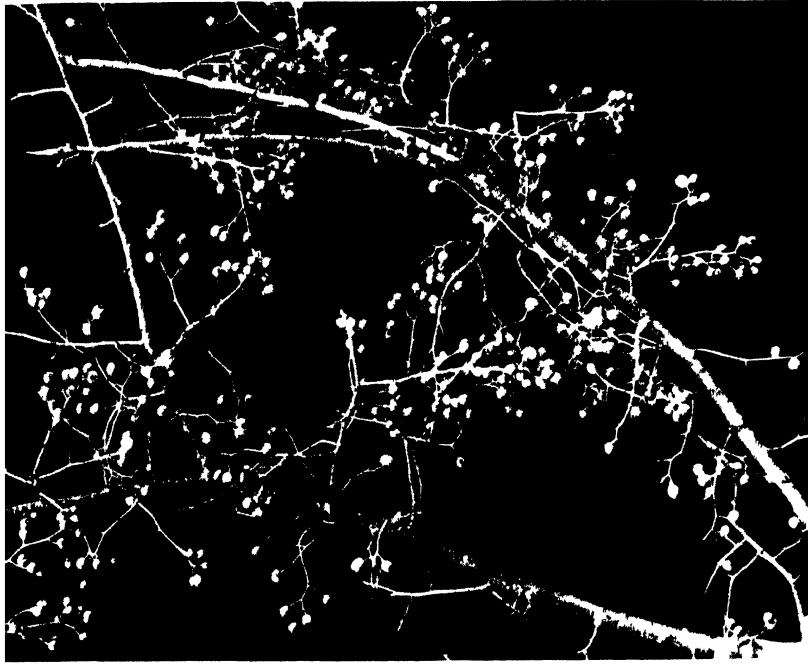


Photo W. Abbing

FIG 7 *Symlocos paniculata* (See p 21)

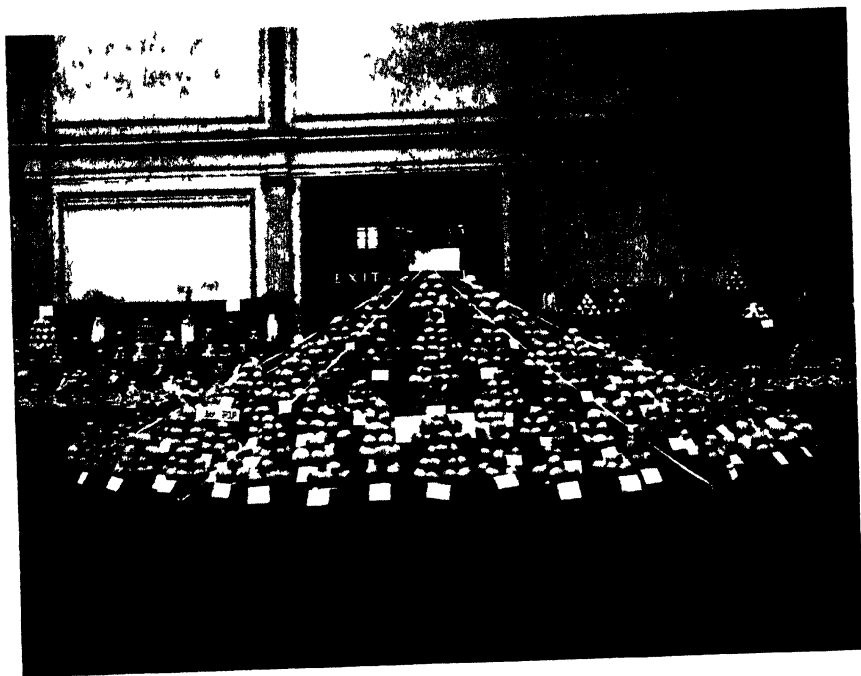
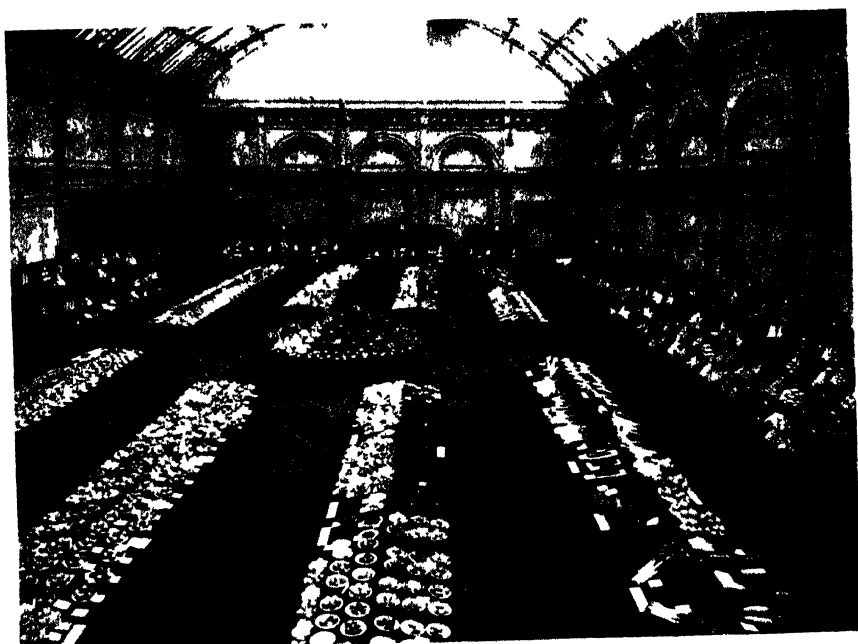


FIG 8 Exhibit of the National Fruit Trials, 1947 (See p 20)



Photos W Abbing

FIG 9—Fruit and Vegetable Show, October 7 and 8, 1947 (See p 20)



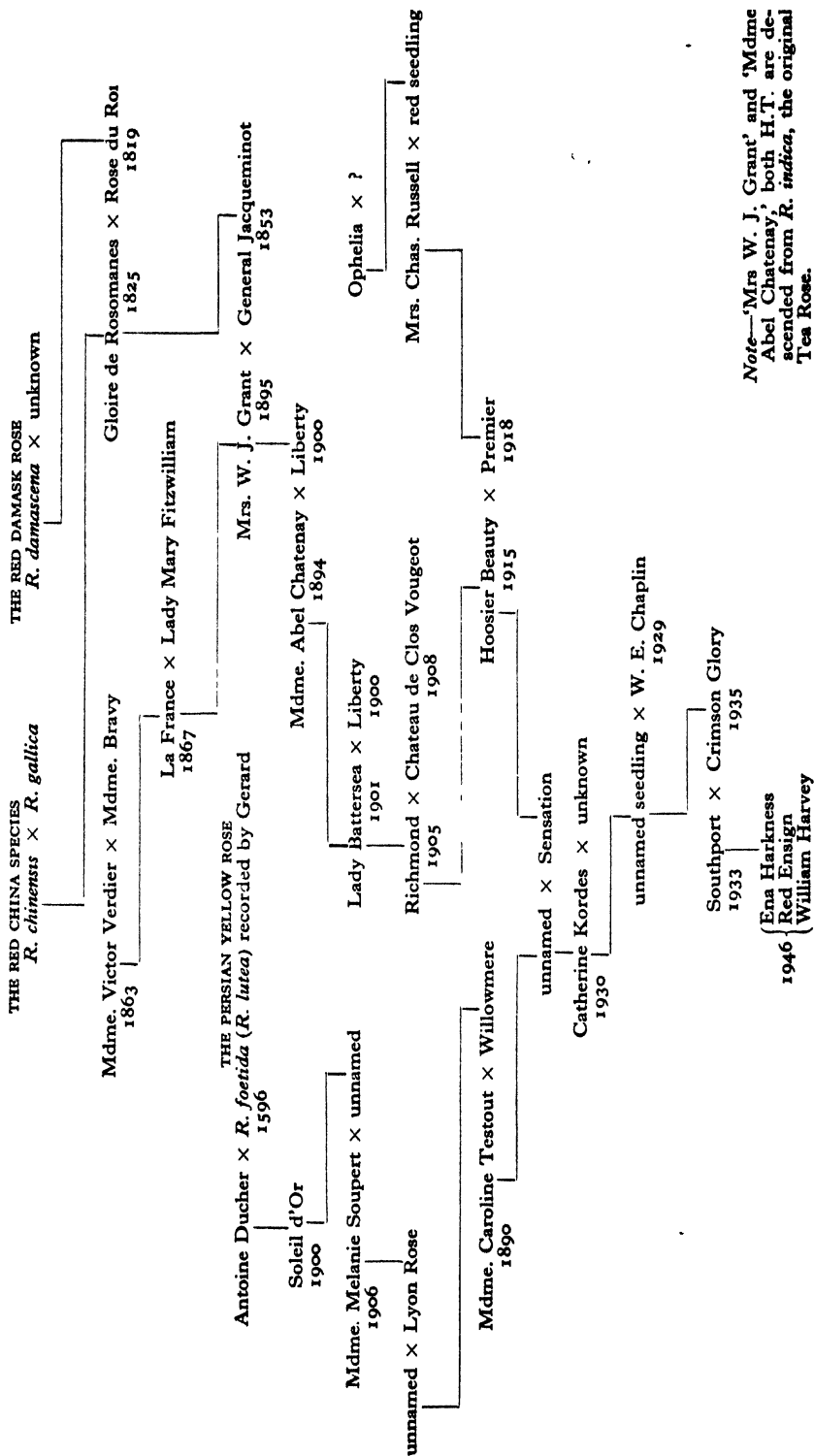
FIGS. 10 and 11 Propagation of *Lapageria rosea* (See p. 23)



WISLEY

FIG. 12 The round pond by the A G M collection *Pontederia cordata* in foreground

PEDIGREE OF THREE NEW REI ROSES



For some time I have been puzzled where the damask fragrance came from in all these red Roses as it does not exist in *R. chinensis*.

I have however, just come across a record that the second parent of 'Jacqueminot' was 'Portland Rose' (also known as 'Rose du Roi') and that the latter was directly descended from *R. damascena* × unknown.

'W. E. Chaplin' is red but scentless, so that in this case the fragrance is transmitted through the seed parent. The remontant and continuous blooming qualities and the dwarf habit (contrary to the semi-climbing habit of *R. chinensis*) come down through 'Mrs. W. J. Grant' and 'Mdme. Abel Chatenay' (Hybrid Teas) from *R. indica* the original Tea Rose.

Cultivation

Some old gardeners are notoriously difficult to educate and many of their methods of cultivation are difficult to correct. One of the old practices is to put manure on the Rose beds in the autumn to protect the plants during the winter. This will do nothing of the sort; on the contrary the manurial salts may stimulate premature growth during mild periods, or the manure will keep the beds clammy wet and water-logged during rainy spells than which nothing could be worse. If the plants need protection, and they certainly did in many localities last winter, rake up the soil 6 inches deep round the crowns. This enables surplus water to drain away and so keeps the crown drier. Last winter the thaw in the middle of two frost periods which occurred in many localities left pools of water round the base of the plants which, when the frost clamped down again, froze the plants in solid ice. It was this solid ice round the crowns of the plants which killed so many of them. In Scotland and Northern England, where the frost was continuous and the beds throughout the period were deep in snow, very little if any damage was done. The earthing up must be levelled off as soon as possible in March after winter frosts are over.

Another fallacy is that Roses like clay. Roses do not like clay. Oak trees may grow in clay, but Roses will not, they are not really fond of very heavy loam over clay subsoil, excepting perhaps the wild briars. The best soil for Roses is a medium loam over a well-drained subsoil. If the drainage is not natural, it must be provided, especially when the subsoil is clay.

One of the greatest fallacies of all is to put quantities of manure at the bottom of the beds when making them up. Nor is it indeed necessary to put any manure at all in the beds when preparing them. Far more important is it to mix in ample quantities of compost, peat, chopped turf, old hay, straw and any kind of rotted vegetable material to make the top spit rich in humus. It is advantageous, however, to mix bone meal in the top spit, about three double handfuls or more to the square yard. This is a mild and long lasting manure which can do no harm to newly-planted Roses. The proper place for manure (farmyard, stable or chemicals) is on the surface of the beds in April, to be lightly forked in the following winter. With newly-planted Roses, leave even this surface dressing until the second year, but when planting, a handful of bonemeal and two or three handfuls of peat are advantageous.

DEAN HOLE once wrote of having his beds prepared 4 feet deep.

Labour was cheap in those days. Roses will grow perfectly well in properly prepared soil 10 inches deep, providing there is another spit of well drained soil beneath and the surface is subsequently properly cultivated and manured. It is the humus and the drainage which are the first essentials.

Another mistake is too much lime. In the bottom spit a quantity of lime in a clayey soil helps to break it up, but in the top spit it can easily be overdone, especially where the soil is light. Roses do not do well in an alkaline soil; the best soil for Roses should have a slightly acid reaction about pH6.

Stocks: the universal root stock in England for budding Roses has been *canina* briar from "time immemorial." The shortage of imported stocks since 1939 has, however, compelled many nurserymen to use others, and they have found that on soils from light to medium the *Polyantha simplex* (or *Multiflora japonica*) gives as good or in many cases better results than *canina*, but special care has to be taken to see that the roots do not dry out between lifting and transplanting. In heavy soils *canina* is still considered the best stock for budding dwarfs as well as standards and it also transplants best and with the least risk of damaging the roots.

Laxa is also coming into use again, and I have seen in some nurseries *laxa* and *canina* in nearby rows budded with the same variety with the former in every case giving better plants. In America probably 80 per cent. of the Roses throughout the continent are budded on *multiflora*. In California and the North-West, a China stock called *odorata* and 'Ragged Robin' ('Gloire de Rosomanes') are in principal use, rarely if ever is *canina* used. In this country the *canina* and *rugosa* are both used for standard stocks but the former is far and away the better. *Rugosa* has the extremely bad habit of throwing up suckers from roots which may appear all over the bed two or three feet away from the parent. *Rugosa* is also decidedly not so hardy as a stock plant. Nearly every one in my garden was killed last winter, but very few *caninas* were harmed at all. Unfortunately *rugosa* is easier and very much cheaper to propagate. The briars (*canina*) take several years to grow on from seedlings, or when cut from the hedgerows suffer a high percentage of loss in transplanting. The present price charged for briar standards is not excessive, therefore, and personally, I would never use *rugosa* again except in the glasshouse for pot work.

Pruning; is this still a thorny (!) subject? perhaps, but I have not time to talk about that now.

TWO NOTABLE OCTOBER EXHIBITIONS

THE FRUIT AND VEGETABLE SHOW, OCTOBER 7-8, 1947

THE Autumn Fruit and Vegetable Show attracted a large number of exhibits, completely filling the Old Hall. The New Hall was filled at the same time with a fine exhibition of autumn flowers, foliage and berries. In most parts of the country the fruit crop has been heavy this

year and many people undoubtedly found the Show helpful in identifying and selecting varieties as well as showing the attractions of growing really *clean* fruit.

A circular table in the centre of the Hall was occupied by a large exhibit of Apples from the National Fruit Trials at Wisley. Approximately one hundred and ninety varieties were staged and the Apples were arranged in eight distinct groups. The groups consisted of (1) Smooth Green Sour Apples, e.g. 'Lord Derby,' (2) Striped Smooth Sour, e.g. 'Lane's Prince Albert,' (3) Striped Smooth Sweet, e.g. 'Peasgood's Nonesuch,' (4) Golden Apples not striped, e.g. 'Golden Noble,' (5) Entirely covered with Red, e.g. 'Baumann's Reinette,' (6) Reinettes Red and Russet, e.g. 'Cox's Orange,' (7) Russet without Red, e.g. 'Brownlee's Russet,' and (8) the Canadian and American varieties such as 'Jonathan.' Each group consisted of an admixture of old and new varieties, and amongst the latter a few outstanding examples were 'Sunset,' 'Lord Lambourne,' 'Merton Russet,' 'Bowden's Seedling,' 'Winston,' 'Merton Worcester,' 'Howgate Wonder' and 'Shoosmith' (Figs. 8 and 9).

Dessert Apples were well represented also in Class 13, which consists of exhibits of twelve varieties. MR. H. H. CRANE's exhibit won first prize in this class and he showed the following: 'American Mother,' 'Laxton's Fortune,' 'Orleans Reinette,' 'James Grieve,' 'Ribston Pippin,' 'Cox,' 'Rival,' 'Fearn's Pippin,' 'Crimson Cox,' 'Salcote Pippin,' 'Ellison's Orange' and 'Laxton's Superb.' The fruit was outstanding for colour, shape and evenness of form. Many members of the Fruit Group visited his orchard earlier in the year and saw his trees. There were seven other entries for this class. There were also numerous classes for individual varieties of Apple, both dessert and cooking, and it was amply demonstrated that the popularity of many of the older varieties such as 'Blenheim Orange,' 'Cox's Orange Pippin' and 'Ribston Pippin' was still high. Among cooking Apples particularly noticeable was the fine dish of 'Howgate Wonder' exhibited by THE OLD MANOR (SALISBURY), LTD. This variety is very long keeping and should become popular for exhibition and for use.

The exhibits of Pears were also of a very high quality and many mouths must have watered at the fine dishes of the delicious 'Doyenné du Comice.'

New seedling Apples were shown by East Malling Research Station. Many of these were derived from MR. TYDEMAN's crosses of 'Cox's Orange Pippin' and 'Worcester Pearmain' made with the object of increasing the length of season of Apples of these types. A fuller account of some of these varieties by MR. TYDEMAN himself will be found in the *Fruit Year Book*, the first part of which has just been issued. New seedling Apples of merit were also shown by the John Innes Research Station and such exhibits provided one of the most interesting features of the Fruit Show.

Members of the Fruit Group staged a composite table display. On the table set aside for small exhibits from Fellows one of the most interesting exhibits was a branch of Pomegranate from the Royal Gardens at Windsor carrying both flowers and fruits. The tree from which it

came is 20 feet high and grows on a south-west wall. Walnuts from the East Malling Research Station were shown, illustrating the varieties mentioned in the recent article in the JOURNAL (July 1947) by E. M. GLENN, R. G. HATTON and A. W. WITT.

The Vegetables were of a very high standard, and many unusual varieties were shown. Three Gold Medals were awarded for displays of Vegetables and five new varieties of Marrows were highly commended after trial at Wisley.

In the evening of the first day of the Show the Fruit Group held their annual dinner under the Chairmanship of MR. RAYMOND BUSH.

TREE AND SHRUB COMPETITION, OCTOBER 21, 1947

Both the displays of autumn berries and autumn leaf colouring were very fine and attracted much attention. Several shrubs were seen with most decorative berries, which will probably have been new to many visitors to the Hall. An Award of Merit was given to *Symplocos paniculata*, an uncommon tree with brilliant turquoise-blue berries. The tree from which these were cut is growing on the Crown Lands at Windsor. The flowers are white and slightly fragrant. The berries are the chief feature of the plant and are borne on small panicles which are slightly pendulous and each berry is mottled, shining as if with a glaze (Fig. 7). This species, which was formerly grown under the name of *S. crataegoides*, deserves to be much more commonly grown in English gardens. It is certainly one of the most decorative and unusual berried shrubs for autumn decoration that has been shown for some time. It seems to be more widely grown in America than in this country, and MR. BEAN says that it fruits profusely in the Arnold Arboretum each year. It is a native of Asia from the Himalayas to Japan. With this the Commissioners of Crown Lands at Windsor Great Park showed *Celastrus orbiculatus*, *Callicarpa Giraldiviana* and *Sorbus americana*. This exhibit was awarded the First Prize for the class of 4 varieties of Trees and Shrubs with decorative fruits. *Callicarpa Giraldiviana* has shiny berries of a most unusual mauve shade in clusters up the stem, while *Sorbus americana* bore very large clusters of sealing-wax red fruit, backed by the attractive pinnate foliage. *Celastrus orbiculatus* (syn. *C. articulatus*) is a very vigorous woody climber, the young stems twining over any support. At first the fruit consists of a green three-valved capsule, but when this opens it reveals the most unusual and attractive combination of colours, the seeds being scarlet, while the inside of the capsule is a strong golden-yellow in colour. The rampageous habit of this plant was well shown by the very large specimen exhibited. This beautiful climber is also widespread in N.E. Asia and it was first introduced to Kew in 1883. MR. BEAN states that the fruits have no attraction for birds and describes it as "the most striking of all hardy climbers during November, December and January."

Another most unusual tree was *Idesia polycarpa*, sent by SIR HENRY PRICE from Wakehurst Place, Ardingly, and this won the first prize for a single vase of a tree or shrub with decorative fruits. This makes a small tree and the fruit hangs in long pendulous loose bunches of dull scarlet

large matt berries. This is well backed by the large cordate leaves and pink petioles. Each berry is about the size of a large pea. MR. BEAN records that this tree is hardy at Kew and fruits annually. The flowers are dioecious and apetalous and yellow-green in colour. This tree is a native of Eastern Asia and was first discovered by the Kew Collector R. OLDHAM in Japan in 1862.

Other noteworthy berried shrubs in the display included a very fine form of *Euonymus europaeus* var. *intermedia* from MR. W. BENTLEY of Quarry Wood, Burghclere, Newbury, which had very deep crimson fruits opening to show bright orange seeds, and *Clerodendron trichotomum* from MR. A. S. BARNES, of Bedford, with bright turquoise-blue berries backed with deep crimson-purple persistent sepals opening flat or recurved, a most unusual and attractive combination. The plant makes a small deciduous tree ten feet or more in height when fully grown. MR. BEAN records that this *Clerodendron* is quite hardy at Kew and likes an open loamy soil.

Among the Sorbi, *S. americana* and *S. scalaris* carried large bunches of scarlet fruit, while the pale mottled coral-pink berries of *S. hupehensis* were attractive, blending well with the slightly glaucous foliage. A good yellow berried form of the crimson *S. Aucuparia* was also shown by COLONEL F. C. STERN under the name var. *xanthocarpa*. Of the Coton-easters, *C. conspicua*, var. *decora* and *C. congesta* were very colourful and can be recommended. Both bear a profusion of brilliant scarlet berries.

Another interesting combination was provided by the Sea Buckthorn *Hippophaë rhamnoides*. This is a native but is not often seen in gardens. The yellow berries and the blue-grey effect of the foliage derived from the under surface of the leaves is very attractive. This shrub is unisexual and it is necessary to plant at least one male to every six female plants. The berries are not usually touched by birds and often remain on the bush till the New Year.

In the classes for coloured foliage the colouring was very brilliant. The first prize for four vases was won by LORD DIGBY, who exhibited from his garden at Cerne Abbey, Dorchester, an unusually deep crimson form of *Euonymus alatus* which showed also very clearly the winged stems. With this he showed *Liquidambar styraciflua*, *Cercidiphyllum japonicum* and *Acer japonicum filicifolium*, a good orange-crimson form.

Particularly noticeable in several exhibits was *Fothergilla monticola*, and the first prize for a single tree or shrub with decorative autumn foliage was won by SIR HENRY PRICE for a vase of this species. The leaves were large and most brilliantly coloured, flaming scarlet with tints of crimson and orange. This plant closely resembles *F. major*, which was recently given an Award of Garden Merit and described in the JOURNAL (May 1947). Another very brilliantly coloured plant was *Enkianthus cernuus* var. *rubens*, sent by SIR GILES LODER from Leonardslee, Horsham. Several exhibits had good vases of *Nyssa sylvatica* and *Oxydendrum arboreum*, both of which colour very brilliantly in the garden. It seemed, however, that they would have been even more brilliant a week or two later. The value of Azalea foliage for autumn colouring was also shown in several exhibits; notable among them was *Rhododendron (Azalea) pentaphyllum*, shown by LORD ABERCONWAY, which

displayed fine yellow and crimson tints. It seems impossible to describe autumn colouring in foliage in terms of one colour alone. Much of the attraction is derived from the combination of tints of several colours and the change over the leaf from one to the other. Both the berried shrubs and the foliage looked particularly fine by artificial light in the evening, although of course, the blue of the *Symplocos* was lost.

A large exhibit of berried shrubs and autumn foliage was also staged from Wisley, and this provided a good complement to the exhibition. The factors producing brilliant autumn colouring in leaves are still by no means understood, but the hot summer during 1947 seems to have been conducive of unusually good tints in many gardens.

NOTES FROM FELLOWS

Lapageria rosea

THE enclosed photographs illustrate how readily *Lapageria rosea* may be increased by means of cuttings. The first pictures the young plants as they were lifted from the bed on September 1 last and the second shows a few which have had the soil shaken off so as to give a clearer view of the rooting system.

The cuttings were inserted under bell-glasses in the open in heathland soil on August 30, 1946. They were 3 inches to 6 inches long; some had heels of older wood attached, but the majority were just cut off below leaf joints and the upper half of each leaf removed so as to conserve in the stems as much sap as possible. All remained dormant until the spring, when they then started to make roots and new leaves. The only water given was a weekly spray during the summer as a precaution against an attack by red spider, and the glasses were not removed except for this and for an occasional weeding. Air was, however, supplied by wedging a $\frac{1}{2}$ -inch block under one side of each glass once the cuttings started to grow (Figs. 10 and 11).

After the photographs had been taken, the plants were put into pots containing equal parts of lime-free loam and decayed oak leafmould, and I am pleased to say that they are now thoroughly established, having made from 6 inches to 18 inches of new growth. No cuttings made in this nursery are ever treated with chemicals, etc.

W. J. MARCHANT,
Staplehill, Wimborne

A Note on Meconopsis

My experience with *Meconopsis* during last winter deserves, I think, to be placed on record, as the conditions under which they survived and flourished seem to have been those against which we have always been warned, and which I had hoped to avoid.

I had redeemed a small piece of bog land—separating it from a stream by a dwarf wall of old and porous brick, against which I built up

a border of suitable soil to a depth of about 2 feet. The top of this wall was some nine inches above the normal winter level of the stream.

In the previous spring I had planted 18 or 20 young *M. Baileyi* plants and half a dozen *M. superba*. I went abroad at Christmas and returned early in March to find the border waterlogged and learnt that it had been under water for some weeks and at times frozen solid. We had of course abnormal floods and frost, with the temperature down to zero (F.) on more than one occasion. There was no sign of my *Mecopopsis*, and I wrote them off as lost, but when the floods subsided and the top soil began to dry the plants commenced to shoot, and from that time on they grew vigorously and I had an unusually fine show of bloom in the summer.

Unfortunately the *M. superba* with two or three exceptions suffered in April from crown rot and perished—those which survived seem healthy. This winter I propose to protect the crowns by surrounding them with varnished paper pots, inverted.

I am growing *M. Dhwojii* this year—they seem strong and healthy and the foliage is very decorative.

SIR AUSTIN HARRIS,
The Old Rectory, Stockbridge, Hants

The Lost Scent of Mimulus moschatus

The note on this subject by MR. W. BALFOUR GOURLAY in the July 1947 issue was of particular interest as there is a possibility that scented musk plants are growing wild in New Zealand. Two species, *Mimulus moschatus* and *M. guttatus*, have been introduced in the past and now grow wild in many parts of the Dominion, where they thrive exceedingly in suitable places, but so far as I know neither species is normally scented, and I certainly have not smelt a scented musk in New Zealand.

Quite recently, however, a young lady told me that she had found a patch of musk with what she described as "an overpowering scent," growing wild in an isolated valley in Marlborough. The lady would not disclose the location of the plants, or even of the valley, which is apparently very much off the beaten track. She has, however, promised to bring in flowers and plants when next she has an opportunity of visiting the place, and we await with great interest the opportunity of smelling natural musk scent for what will be, for most of us, the first time in our lives.

When this case first came to our notice we thought that some early settler had, perhaps, introduced plants of musk before it lost its scent, and that it was still growing in its original location, although the settler, and his home, had long since disappeared. This has often happened in Marlborough and other parts of New Zealand, where a gold rush has led to a sudden temporary influx of population.

Some of the miners (or their wives) must have been keen gardeners, often growing quite rare and unusual plants in their temporary homes. In the colourful days of the great gold rushes in Otago Central, when Gabriel's Gully was yielding gold to the tune of millions of pounds worth a year, and bustling towns sprang up almost overnight in the

roughest country imaginable, a few incurable gardeners actually had collections of plants sent in to them by pack horse (there were no roads) at astonishing expense.

I have seen old trees of *Laburnum Adamsi* and other plants, which could not possibly have got there accidentally, growing in country where some hardy horticulturist must once have planted a garden but where now there is no sign of habitation for miles around.

It would have been possible for scented musk to be planted by a prospector in the Marlborough Province, since there were some minor gold rushes there, but in view of MR. BALFOUR GOURLAY's explanation it seems more likely that the Marlborough plants, if scented, have arisen from a chance sport amongst the naturalized plants. We shall await the next visit of the reticent young lady with considerable interest and impatience.

J. P. HUDSON, M.B.E., G.M., B.SC.(HORT.)LOND., N.D.H.

Osmunda regalis in America

A fern rather difficult to grow

A fern which some at least have experienced difficulty in growing in the open is the Royal or 'Flowering' Fern (*Osmunda regalis*), found in swamps and wet woods in Europe, and a variety (var. *spectabilis*) in similar habitats throughout a large part of North America.

In transferring this fern to one's garden many specimens are likely to be lost. Several years ago I planted three in this manner, only to have two die shortly, and one, though still alive, is gradually deteriorating.

In pots, however, I have had no trouble, not losing a single plant. A 4-inch pot seems ample, even for fairly large specimens. The soil is a light porous one of wood mould, and moderately acid. Soil should be renewed every few years. Plants can be potted at any time. Ample watering is essential. In winter pots can be placed below frost line in leaf-filled pits and removed in early spring. In this way no winter care is necessary. This fern may be a good plant for the cool greenhouse, but I have never seen it tried.

One of my plants whose fronds were 3 inches long when brought in and potted several years ago is now slightly more than a foot in length, and another plant, considerably larger when potted, now shows eleven fronds, a typical frond being about 20 inches in height.

EDWIN D. HULL,
Gary, Indiana

PLANTS TO WHICH AWARDS HAVE BEEN MADE IN 1947

Berberis Jamesiana 'East Lodge' Variety. A.M. November 4, 1947. *Berberis Jamesiana* is one of the most handsome of the many deciduous, red-fruited, Western Chinese species. It is a vigorous shrub attaining a height of 10 or 12 feet, with obovate, often entire, leaves purple when young and red-tinted in autumn, and heavy, pendulous

bunches of richly-coloured sub-globose berries. Seed has often been distributed from Wisley and has given rise to forms of varying merit. Of these, the 'East Lodge' Variety is one of the best. Exhibited by W. B. Cranfield, Esq., F.L.S., V.M.H., East Lodge, Enfield Chase, Middlesex.

***Brassolaeliocattleya* 'Normans Bay' var. 'Royal Bride' A.M.** October 21, 1947. Flower of model formation, of a pleasing purplish-rose colour, and with all the segments effectively crisped at the margin. The result of crossing *Lc.* 'Ishtar' with *Bc.* 'Hartland.' Exhibited by Messrs. Stuart Low & Co., Jarvis Brook. (See p. viii.)

***Campanula lasiocarpa* A.M.** July 15, 1947. A distinct and beautiful species from Kamtschatka, forming tufts of erect stems about 6 inches high, bearing stalked, spatulate, finely dentate leaves 2 to 3 inches long. Each growth bears a terminal flower and often two or three more on lateral branches. The flower is erect, and has spreading, fringed sepals and a corolla 1 inch long and over an inch wide at the mouth, of Wistaria Blue (H.C.C. 640/1). Exhibited by Dr. Walter Weir, The Barn House, Merstham. (See vol. LXXII, p. lxxvii.)

***Chrysanthemum* 'Golden Harvest' A.M.** September 30, 1947. As an early flowering disbudded variety for exhibition. Flower stems strong, 22 to 24 inches long, with medium-sized foliage. Flowers double, reflexed, 5½ inches diameter, bright golden-yellow. Raised and shown by Messrs. H. Shoesmith Ltd., Mayford, Woking, Surrey. (See p. iii.)

***Chrysanthemum* 'Mayford Pink' A.M.** September 30, 1947. As an early flowering disbudded variety, for exhibition. Flower stems strong, 22 to 26 inches long with rather large foliage. Flowers rather flat, 7½ inches diameter, double, bright rose-pink with a creamy golden reverse. Raised and shown by Messrs. H. Shoesmith Ltd., Mayford, Woking, Surrey. (See p. iii.)

***Chrysanthemum* 'Merlin' A.M.** September 30, 1947. As an early flowering disbudded variety, for exhibition. Flower stems 18 to 24 inches long, with rather large foliage. Flowers double, reflexed, 6 inches diameter, chestnut-bronze. Raised and shown by Messrs. H. Shoesmith Ltd., Mayford, Woking, Surrey. (See p. iii.)

***Chrysanthemum* 'Monsal Dale' A.M.** September 23, 1947. As an early flowering disbudded variety, for exhibition. Flower stems 18 to 24 inches long, clothed with small foligae. Flowers double, 5½ inches diameter, reflexed, soft creamy-pink, of good form and substance. Raised and shown by Messrs. J. & T. Johnson, Tibshelf, Derbyshire. (See p. iii.)

***Chrysanthemum* 'Pink Una' A.M.** September 30, 1947, as an early flowering disbudded variety for exhibition. A deep rose-pink "sport" from 'Una.' Shown by Mr. W. H. Dixon, Horsham Nursery, Horsham, Sussex. (See p. iii.)

***Chrysanthemum* 'Roselight' A.M.** September 30, 1947. As an early flowering disbudded variety, for exhibition. Flower stems 18-22 inches long, strong with medium-sized foliage. Flowers reflexed, double, 6½ inches diameter, rose-pink with a pale silvery reverse. Raised and shown by Messrs. H. Shoesmith Ltd., Mayford, Woking, Surrey. (See p. iii.)

Chrysanthemum 'Royal Prince' A.M. September 23, 1947. As an early flowering disbudded variety, for exhibition. Flower stems 16 to 18 inches long, foliage of medium-size. Flowers double, 5 inches diameter, reflexed, rich glowing orange terra-cotta with an old gold reverse. Shown by Mr. H. Woolman, Sandy Hill Nursery, Shirley, Birmingham. (See p. iii.)

Chrysanthemum 'Tibshelf Shell' A.M. September 23, 1947. As an early flowering disbudded variety, for exhibition. Flower stems 18 inches long with very small foliage. Flowers double, incurved, $4\frac{3}{4}$ inches diameter, soft salmon-pink tinged old gold at the centre, of good form, petals stiff. Raised and shown by Messrs. J. & T. Johnson, Tibshelf, Derbyshire.

Clytostoma purpureum. A.M. October 21, 1947. A free-flowering evergreen, greenhouse climber, native of temperate South America. The opposite leaves are composed of three ovate, lustrous green leaflets about 3 inches long, or of a pair of leaflets and a terminal tendril. The flowers are carried seven or eight together in each axil. The corolla is nearly 2 inches long, tubular below, two-lipped with spreading, rounded lobes. The colour is Orchid Purple (H.C.C. 31/2) paling to the white throat of the tube. Exhibited by the Director, Royal Botanic Gardens, Kew. (See p. viii.)

Euonymus semiexsertus. A.M. December 2, 1947. An uncommon Japanese Spindle-tree. It is a deciduous species, at present about 15 feet high at Wisley, with firm, oblong-lanceolate leaves 2 to 3 inches long. Almost every branchlet bears a profusion of small, greenish flowers which are succeeded by rose-pink fruits opening to reveal blood-red, arillate seeds. The fruits hang on the tree longer than those of most other species, and are conspicuous well into December. Exhibited by the Director, R.H.S. Gardens, Wisley.

Fuchsia 'Queen Mary' A.M. October 7, 1947. This lovely single Fuchsia was raised by the exhibitor about twenty years ago and it is thought to be one of a batch of seedlings obtained by crossing the varieties 'Phenomenal' and 'Mrs. Marshall' or 'Rose of Castile Improved.' Its large pendulous flowers have cherry (H.C.C. 722/3) calyx lobes which are longer than the fuchsia purple (H.C.C. 28/1) petals. Shown by Mr. C. J. Howlett, The Yews, Earley, Reading. (See p. v.)

Hosta tardiflora. A.M. October 7, 1947. The late-flowering habit of this Japanese species makes it particularly useful. As in other species of its genus the foliage alone is ornamental, the long-stalked, ovate-lanceolate leaves being glossy, of a very rich deep green, and undulate. The silvery-lilac flowers, although relatively small, are carried in a dense, terminal raceme at the tip of a bronze-mottled scape 1 foot high. Exhibited by the Director, Royal Botanic Gardens, Kew. (See p. vi.)

Laeliocattleya 'Sunburn' var. 'Alaric' A.M. October 21, 1947. Flower of thick texture, orange colour with copper shading, labellum ruby-red and frilled. The result of crossing *Lc.* 'Golden Sunset' with *Lc.* 'Mrs. Medo.' Raised and exhibited by Messrs. Charlesworth & Co., Haywards Heath. (See p. viii.)

Lysimachia Ephemerum. A.M. July 29, 1947. An uncommon

and attractive herbaceous plant, native of Spain and Southern France, introduced two centuries ago. It has erect stems three or four feet high, clothed with glaucous, lanceolate leaves and terminating in long racemes of purplish-tinged white flowers nearly $\frac{1}{2}$ inch across. Exhibited by H. Cornish Torbock, Esq., Crossrigg Hall, near Penrith. (See vol. LXXII, p. lxxviii.)

Nerine 'Caryatid' A.M. November 4, 1947. A very free-flowering variety with large mandarin red (H.C.C. 17/1) flowers borne mostly seventeen in a truss. Raised and exhibited by Major Edmund de Rothschild, Exbury, Southampton.

Nerine 'Falaise' A.M. November 4, 1947. A large scarlet (H.C.C. 19/1) variety in which the colour becomes less intense along the middle of the perianth-segments. The flowers are borne in umbels of fifteen. Raised and exhibited by Major Edmund de Rothschild, Southampton.

Nerine 'Lionel' (shown as *Nerine 'Oriflamme'*) A.M. November 4, 1947. This handsome variety resulted from a cross between *Nerine Fothergillii* and a pink seedling. The vermilion (H.C.C. 18) flowers are of medium size with crimped perianth segments and are borne in umbels of 14 on stout scapes 18 inches tall. Raised and exhibited by Major Edmund de Rothschild, Exbury, Southampton.

Nerine 'Queen Mary' A.M. October 21, 1947. A fine vigorous variety having lovely rose-pink flowers measuring $2\frac{1}{2}$ inches across with broad segments and borne mostly in trusses of nine. Exhibited by W. B. Cranfield, Esq., F.L.S., V.M.H., East Lodge, Enfield Chase. (See p. vii.)

Phyllitis Scolopendrium crispa 'Christopher Robinson.' A.M. October 21, 1947. A very handsome form of the Harts-tongue Fern, found wild on Warton Crag some years ago by Mr. T. Bolton. The bright green frond is 15 inches long (without the stalk) and 4 inches wide, and is remarkable for its deeply crimped and pleated margins. Exhibited by W. B. Cranfield, Esq., F.L.S., V.M.H., East Lodge, Enfield Chase, Middlesex. (See p. viii.)

Polypodium vulgare pulcherrimum, May's Form. A.M. November 4, 1947. This attractive Fern belongs to the 'plumosum' section of the species, and has bipinnatisect fronds 9 inches long, elliptic in outline and made up of about sixteen pairs of pinnae. The variety *pulcherrimum* was found by the late Mr. T. Addison in 1861 at Whitbarrow, and received the Society's F.C.C. in 1864. Exhibited by W. B. Cranfield, Esq., F.L.S., V.M.H., East Lodge, Enfield Chase, Middlesex.

Polystichum angulare plumosum grande. A.M. October 7, 1947. An unusually fine form of the 'plumosum' section of this hardy Fern, found wild in Dorset by the late Mr. James Moly. The fronds are spreading, up to nearly 3 feet long, the stipe covered below with brown, chaffy scales. The pinnae reach a length of over 4 inches, each being sub-divided into about sixteen pairs of deeply incised, lanceolate pinules. Exhibited by W. B. Cranfield, Esq., F.L.S., V.M.H., East Lodge, Enfield Chase, Middlesex. (See p. vi.)

Rhododendron 'Chrysomanicum' (*chrysodoron* ♀ × *burmanicum*) A.M. April 1, 1947. A very pretty hybrid with flowers of Primrose Yellow (H.C.C. 601/2). The flowers have funnel-shaped corollas about 2 inches long, with five spreading and rounded lobes. They are

borne on short pedicels in trusses of eight. The leaves are elliptic, ciliate, scaly beneath, 3 inches long and $1\frac{1}{2}$ inches wide. Exhibited by Lord Aberconway, C.B.E., V.M.H., Bodnant. (See vol. LXXII, p. lxi.)

Rhododendron (Azalea) 'Cornish Glow' A.M. May 20, 1947. A very showy variety with a full truss of eighteen large flowers. The long, tubular corolla has broad-ovate, spreading lobes. The colour is crimson in the bud, changing in the fully expanded bloom to orange-yellow, flushed on the outer lobes with rosy orange. The appearance of the flowers is enhanced by the bronze-flushed young foliage. Exhibited by Col. E. H. W. Bolitho, D.S.O., Trengwainton, Penzance. (See vol. LXXII, p. lxv.)

Rhododendron 'Cremorne,' Townhill form ('Luscombei' ♀ × *campylocarpum*). A.M. April 29, 1947. The original 'Cremorne' was registered by the late Mr. L. de Rothschild in 1935, but has not been certificated. The present variety has a full 12-flowered truss of bell-shaped, 5-lobed flowers 2 inches long and $2\frac{3}{4}$ inches wide at the mouth. The unopened bud has a beautiful soft pink colour which disperses, as the flower expands, to Chinese Yellow (H.C.C. 606/3) flushed and margined with rosy Coral (about 614/2). Exhibited by the Rt. Hon. Lord Swaythling, Townhill Park, Southampton. (See vol. LXXII, p. lxiii.)

Rhododendron 'Golden Oriole' (*moupinense* ♀ × *sulfureum*). A.M. April 1, 1947. An attractive small plant suitable for the rock garden. The stems are bright cinnamon-brown, and bear elliptic, coriaceous leaves about 2 inches long and scaly beneath on red petioles. These, together with the crimson bud-scales, form a pleasing background to the three-flowered trusses of Dresden Yellow (H.C.C. 64/2) flowers. The corolla is $1\frac{1}{2}$ inch long, 2 inches wide at the mouth, with five rounded and spreading lobes. Exhibited by C. Williams, Esq., M.P., Caerhays Castle, Cornwall. (See vol. LXXII, p. lxi.)

Rhododendron 'Icarus' ('A. Gilbert' ♀ × *herpesticum*). A.M. May 20, 1947. A flower of unusual colouring. The deep rose-pink bud opens to a flower of biscuit colour shaded rose, with a bell-shaped, 6- or 7-lobed corolla $2\frac{1}{4}$ inches long and $2\frac{1}{2}$ inches wide. The flowers are borne on reddish-brown, glandular pedicels $1\frac{1}{2}$ inch long in flat-topped trusses of eight. The leaf is oblanceolate with recurving margins, dull green above, paler beneath, about 4 inches long. Exhibited by Major E. de Rothschild, Exbury. (See vol. LXXII, p. lxv.)

Rhododendron 'Icarus' var. 'Organdie' A.M. May 20, 1947. A seedling from the same cross as the preceding, differing in its slightly smaller leaf, pale green pedicels, and 5-lobed flower 2 inches long and $2\frac{1}{2}$ inches wide, biscuit or lemon-yellow with a distinct rose-pink edge and a pink zone about $\frac{1}{4}$ inch deep at the base of the corolla. Exhibited by Major E. de Rothschild, Exbury. (See vol. LXXII, p. lxv.)

Rhododendron 'Karkov' (*Griersonianum* ♀ × 'Red Admiral'). A.M. May 20, 1947. A very attractive variety with a compact, globular truss of about sixteen flowers on short, glandular pedicels. The funnel-shaped, five-lobed corolla is 3 inches long and measures $3\frac{1}{2}$ inches across the crimped and waved mouth. In colour it is a uniform carmine-rose, faintly and evenly spotted. The narrow elliptic leaf is dull mat green above, paler beneath, the blade 6 inches long, the petiole $1\frac{1}{2}$ inches

long. Exhibited by Major E. de Rothschild, Exbury. (See vol. LXXII, p. lxxv.)

Rhododendron 'Lady Chamberlain' var. 'Golden Queen' (*cinnabarinum* var. *Roylei* ♀ × 'Royal Flush' orange var.). F.C.C. May 20, 1937. A delightful variety raised by the late Mr. L. de Rothschild. It is a plant of erect habit with elliptic leaves about 3 inches long, glossy dark green above, paler and covered with brown scales beneath. The truss is made up of six or seven pendulous flowers about 2½ inches long, of a soft salmon-pink shaded with orange. The waxen-textured corolla is tubular below, expanding to a smooth, open, five-lobed mouth. Exhibited by Major E. de Rothschild, Exbury. (See vol. LXXII, p. lxxv.)

Rhododendron 'Portia' (*strigillosum* ♀ × *euchaetes*). F.C.C. April 15, 1947. This outstanding hybrid received the A.M. on April 24, 1935. It has a compact, flat-topped truss of fleshy, dark crimson-scarlet flowers with dark nectaries at the base. The corolla is 1¾ inches long and nearly 2 inches across the mouth, the stamens and style are pinkish. The leaf is oblanceolate, about 6 inches long and 2 inches wide, dark green and rugulose above, paler beneath. Exhibited by Lord Aberconway, C.B.E., V.M.H., Bodnant. (See vol. LXXII, p. lxi.)

Rhododendron 'Tortoiseshell' var. 'Wonder' (*Griersonianum* ♀ × 'Goldsworth Orange'). A.M. May 20, 1947. The uniform salmon-pink flowers of this pretty hybrid have widely funnel-shaped corollas 2½ inches long and 3½ inches wide, subtended by petaloid calyces up to ¾ inch long, and are arranged in a truss of up to a dozen on dark red, hairy pedicels up to 1½ inch long. The leaf is oblanceolate, with recurved margins, dull dark green above and pale beneath, 5½ inches long. Exhibited by Messrs. W. C. Slocock, Ltd., Goldsworth Old Nursery, Woking. (See vol. LXXII, p. lxxv.)

Rhododendron yakusimanum. F.C.C. May 20, 1947. This rare and distinct Japanese member of the Ponticum Series attracted a great deal of attention upon its appearance in the Wisley exhibit at the Chelsea Show of 1947. The plant exhibited was compact and dome-shaped, about 2½ feet high and 3½ feet across, and carried a flower-truss at the tip of almost every growth. The flattish truss carries up to twelve flowers on brown-tomentose pedicels 1½ inch long. The pink buds open to widely bell-shaped, 5- to 6-lobed white flowers 1½ inch long and 2¼ inches wide. The opening leaves, like the stems, are covered with greyish-white tomentum. The mature leaf is about 3 inches long, with recurved margins and tip, glossy dark green above, heavily covered beneath with brown tomentum. The systematic position of the species is discussed by Dr. J. Macqueen Cowan in an article in the *R.H.S. Journal*, October, 1947. Exhibited by the Director, R.H.S. Gardens, Wisley. (See vol. LXXII, p. lxxv.)

Rose 'Peace' A.M. September 9, 1947. A beautiful, fully double fragrant H.T. variety with large golden yellow flowers of perfect form delicately edged with pink. The vigorous dark green foliage is abundant and of stout texture. Raised by M. Meilland at Tassin-le-demi-lune, France; introduced and exhibited by Messrs. Wheatcroft Bros., Ltd., Ruddington, Nottingham. (See vol. LXXII, p. lxxxiii.) *

BOOK NOTES

"Trees in Britain and their Timbers." By Alexander L. Howard. (Country Life, Ltd.) 25s.

The late Alexander Howard was a man of great ability and charm, and his practical knowledge of trees and timbers was remarkable. He travelled far to study all kinds of living specimens and was a connoisseur of various timbers. It was delightful to hear him talk about them. His friends were eager that he should write down the most interesting of the many interesting accounts he could give of the growing and cutting down of trees, and of the uses of their woods. Records of his own experience and personal observation form the most valuable part of this attractive book. Would that he had lived to give us many more of them!

The illustrations are admirable and worthy of both the author and the publisher. No one can handle the book without a quickening of the desire to plant trees, both conifers and, still more, hard woods, to make up for the very serious losses of the present century, and to maintain and develop the beauty and productivity of British woodlands.

J. W. HUNKIN

"The Arboretums and Botanical Gardens of North America." By Donald Wyman. *Chronica Botanica*, Vol. 10, No. 5/6, pp. 395-398. \$1.50. (Waltham, Mass; The Chronica Botanica Co., London, W.C. 2; Wm. Dawson & Sons, Ltd.)

All who are interested in plants owe a great debt to Dr. Verdoorn and the Chronica Botanica Co. for the long list of publications they have produced in the last ten years. Like the present volume, they each meet a real want and meet it well. Dr. Wyman, acting under the auspices of the American Association of Botanical Gardens and Arboretums, has compiled his book from information supplied in answer to a questionnaire sent out in the spring of 1947, and to the detailed particulars of the aims, size, staff, etc., of each institution he has prefixed an excellent section on "How to establish an arboretum or botanical garden"; particularly good is the advice given on "Labelling and Mapping." There are illustrations and plans of gardens, American and non-American, ancient and modern (the absence of a picture of Kew is a little surprising), lists of gardens proposed and defunct, of gardens classified under plant groups in which they specialize, a bibliography (which would be easier to consult if initials came after, not before, author's names) and good indexes.

Dr. Wyman does not attempt what would have been the extremely interesting task of analyzing the characteristics of American gardens and discussing past, present and future trends in their development; but he has provided the materials in a convenient and attractive form for this to be undertaken by anyone interested in the subject.

J. S. L. GILMOUR

"The A.B.C. of the Greenhouse." By W. E. Shewell-Cooper. (English Universities Press, Ltd., 329 pp. Illus.) 4s. 6d.

The author has written a book which contains much elementary horticultural information helpful to those undertaking the management of a greenhouse for the first time. The chapters on "Composts and Potting" and "Early Orchids," and the writing on Carnations, are very well done, and it is to be regretted, therefore, that the remainder of the book includes many statements and drawings that are a little misleading.

On page 231 *Luculia* is said to consist of "evergreen flowering shrubs with pretty ornamental foliage"; surely "pretty ornamental foliage" was meant for some other plant? On page 93 the statement that "It is always better to grow a vine in a border outside" is too definite and needs qualifying. The drawings of the greenhouse construction would have been better drawn to scale. On page 22, the house illustrating ventilation, judging from the layers of bricks, has a door $4\frac{1}{2}$ to 5 feet in height. On the same page, the drawing of a "Cucumber and Propagating House" shows no hot water pipes for the bottom heat most essential for this type of house. On page 23, in the drawing entitled "Span roof Greenhouse no staging borders planted up," there is a high wall of nine layers of bricks, and side ventilation of less than 18 inches to the roof of the house. Further the hot water pipes are arranged on a brick foundation in such a manner as to waste quite one-third of the planting capacity of the floor.

More care to include the best forms when a selection of species or varieties is recommended would have avoided the omission of 'Madresfield Court' from the Black Grapes, 'Superlative' from the Melons, and *C. grandiflora* from *Campsis*. The nomenclature used is not always up to date; for example, the Garden Hydrangeas are placed under *H. hortensis* instead of the now generally accepted *H. macrophylla*, and *Bignonia* is used for *Campsis*. These examples are only a few of the many errors that it is hoped will be corrected in a later edition.

F. HANGER

"Everyday Gardening in India." By E. W. Grindal. (Taraporevala, Bombay.) 14 rupees 14 annas.

This little book of 250 pages is the work of an amateur and is intended for amateurs. In it the author gives freely of a ripe experience and not only tells the beginner what to

aim at but what to avoid. As the author says in his preface, "the right way is no more trouble than the wrong." Quite so, but the difficulty has been that the beginner doesn't know what is the right way and the wrong often comes more naturally. Many a young official or business man has found himself suddenly with a garden to keep up or a waste to be turned into a thing of beauty. In the course of time he learns from his failures; but what a saving of time and temper such a guide as this would have effected! Books on gardening in the tropics there are in plenty, but we cannot recall any to mind in which the "don'ts" receive equal value to the "do's" and in which so much practical wisdom is displayed. Whether information is required on lawns, shrubberies, annual beds, hedges, roses, trees, vegetables or mushrooms, it is all to be found within these pages, with special notes on difficult species or extreme conditions. There are useful hints on cuttings and layers and on seed collection which, if followed, will save money and eliminate disappointments. We have nothing but praise for this book, and as far as we, and presumably a whole generation of dwellers in India, are concerned, it has come twenty-five years too late. There is no index but a full "Table of Contents."

N. L. BOR

"Swarm Control Survey." By E. R. Dent. (Gale & Polden. 1946, pp. 87.) 8s. 6d.

This book is written to help those who have a fairly good knowledge of bee-keeping, not as an elementary handbook to bee-keeping in general. Swarm management, control and prevention are subjects that face all keepers of bees; time and trouble are essential, so it is well worth knowing about them. The subjects of de-queening, re-queening and queen-rearing are fully discussed, giving the methods of various experts with comments on their success or difficulties, which require a considerable amount of elementary knowledge to follow. American methods as well as British are considered in relation to climate, etc. Taking swarms clustered in awkward positions is a useful chapter. Hints on manipulation include:—Choice of queen cells, cutting out queen cells, finding queen, introducing queen. Subduing includes:—smoking, use of carbolic cloth (1 in 10) sprinkled on cloth, keep in screw-topped jar, a medicine bottle is a useful receptacle for the solution; for a really vicious colony sprinkle it with methylated spirit 1 part, methylated chloroform 2, methylated ether 2, the anæsthetic poured on the cloth. A Hive Record is recommended, preferably kept in a book, recording for each colony, age and origin of queen, dates of spring cleaning, supering, removing supers, feeding, swarm control manipulation, quantity of brood and stores. The book ends with a most interesting diagram of "Bee-keeping Record" on sectional paper (10 lines to inch) for each day, week starting, blossom periods of principal plants yielding nectar, weather, nectar flow, swarms. Although there is a note, "Above data are fictitious," it is a splendid example. The author is a Rear-Admiral and the profits from the sale of the book will be devoted to "King George's Fund for Sailors," so one hopes the little book will have a good sale.

C. H. HOOPER

"Fruit Salad." By Raymond Bush. (Demy 8vo. Illus.) Cassell. 7s. 6d.

This little book contains a series of short chapters based on "jottings from a Fruit-grower's Diary." They range widely and imaginatively, as well as lightly, over a broad field, and I read them with real enjoyment. Among them, however, will be found a number of most valuable hints on the growing and storing of fruit. His vision of the future fruit farm entranced me, and a little note at the end shows us that many of his seemingly fanciful suggestions have come true since he wrote the article. Mobile blowers to combat frost have been made for trial in this country after trial in America. Of the difficulties of retiring and living "off the land" Mr. Bush writes helpfully, if realistically, and from thence he wanders to a disquisition on the attractions of autumn leaf colour in pears and the relation of colour and flavour in dessert apples. Other chapters deal with the amount of fruit a tree can bear, gas storage of apples, as well as the foibles of his pickers and his dog.

F. M. SYNGE

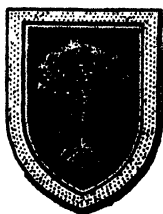
"Carnations and all Dianthus." By Montagu C. Allwood. 3rd ed. 8vo. xxxii + 380 pp. Ill. (Allwood Bros., Haywards Heath, Sussex, 1947.) 21s.

The second edition of this standard work (reviewed in R.H.S. JOURNAL, 61, 234; 1936) appeared in 1935 and was nearly double the size of the first edition published in 1926. This third edition has grown from 215 to 380 pages and contains much new matter. For the Carnation enthusiast, whether amateur or professional, it is indispensable.

W. T. STEARN

JOURNAL OF THE ROYAL HORTICULTURAL SOCIETY

Vol. LXXIII



Part 2

February 1948

THE SECRETARY'S PAGE

Annual Report—The Annual Report and Accounts are published in this number, and will be presented by the President at the Annual General Meeting on Tuesday, February 17, at 3 P.M., in the Lecture Room of the New Hall. The President will also present the Annual Awards for 1947.

Programme of Meetings—The programme of meetings arranged for the coming year was given in the December (1947) number of the JOURNAL. The first Show of the year will take place on Tuesday, February 17 (12 noon to 6 P.M.) and Wednesday, February 18 (10 A.M. to 5 P.M.). The next Show will be held on Tuesday, March 2 (12 noon to 6 P.M.) and Wednesday, March 3 (10 A.M. to 5 P.M.).

Presentation—On Tuesday, March 2nd, at 3 P.M. in the lecture room, New Hall, MR. T. S. ELIOT, O.M., on behalf of MRS. JOHN CARROLL PERKINS, of Boston, Mass., U.S.A. will present to the Society her collection of lantern slides of famous English gardens. A selection will be subsequently shown.

Demonstrations at Wisley—There will be no practical demonstrations at the Gardens during February, but the following demonstrations will take place in March:—

Vegetable Garden

Wednesday and Thursday, March 3 and 4—Outdoor Seed-bed Preparation and Seed Sowing (2 to 4 P.M.).

Flower Garden

Wednesday and Thursday, March 10 and 11—Pruning of Roses and Shrubs (2 to 4 P.M.).

Wednesday and Thursday, March 17 and 18—Seed Sowing and Vegetative Propagation of Alpines (2 to 4 P.M.).

Fruit Garden

Wednesday and Thursday, March 24 and 25—Spring Spraying of Fruit Trees (2 to 4 P.M.).

Examination for the National Diploma in Horticulture with Honours—This Examination, which was introduced last year, is open only to those who have already obtained the National Diploma in Horticulture. The written part of the examination consists of three papers, including one to test the candidate's familiarity with recent developments in the science and practice of horticulture. In addition, there is one day's practical examination.

Candidates must produce evidence of having gone through a satisfactory curriculum in an approved institution, and are required to show their ability to lay out experimental plots, to conduct trials, and to give lectures and demonstrations. Successful candidates are entitled to place "N.D.H.(Hons.);" after their names.

Six candidates entered for the examination in 1947, the written part was held in April and the practical part in September. The N.D.H.(Hons.) has been awarded to three of them, as follows:—

MISS M. ARMITAGE

MR. D. MELLARD

MR. F. W. SHEPHERD

Examination for the National Certificate in Elementary Horticulture—This examination will be held in 1948—the date to be published later.

White Fly Parasite at Wisley—Owing to increasing calls on glasshouse space at the Society's Garden at Wisley, it will unfortunately not be possible, in future, to distribute white fly parasite to Fellows. Attempts are being made to find an alternative source of supply.

Publications

Year Books—*The Fruit Year Book*, the *Daffodil and Tulip Year Book* and the *Lily Year Book* have been published and are available price 8s. 6d., postage and packing 6d. The *Rhododendron Year Book* is expected from the binders during February.

Botanical Magazine—It is regretted that owing to technical difficulties at the printers the publication of the first part of the New Series of the *Botanical Magazine* and the issue of the Prospectus have been delayed, but it is hoped that they will be ready shortly.

R.H.S. Gardener's Diary—The supply of Diaries bound in Morocco leather is now exhausted, but a few copies of those bound in Pluviusin are still available, price 3s. 4d. post free, and a few refills for Crocodile cases price 2s. 10½d.

WISLEY IN FEBRUARY

THIS month, noted for its fluctuations of temperature and mixture of sun and storm, marks the end of winter, and with the increasing power of the sun plant life again awakens and a quickening interest is seen in all those interested in horticulture.

Visitors to the Gardens will find the main display of flowers still confined to the glasshouses, but an increasing number of plants in bloom will be found in other parts of the Gardens, particularly towards the end of the month.

The Half-hardy House contains a few additions to the plants in flower noted last month: particularly *Crytanthus lutescens*, with umbels

of pale yellow, tubular flowers on 9 inch stems. This easily grown South African bulb requires only the minimum of heat with a thorough ripening of the bulbs during the late summer, to ensure a good display of flowers every spring. An unusual plant is the herbaceous climber *Canarina Emini*, planted near the end of the house; the orange-red Campanula-like flowers are produced over a long period and will repay close inspection.

The Trials House is completely filled by *Primula malacoides* in many varieties now in full flower; this is the first full trial of pot plants for several years, and the progress made in selecting and breeding this *Primula* is well illustrated.

Sheltered by the Temperate House many shrubs not hardy in the open at Wisley are in full flower; Camellias noted previously continue in flower, while later varieties opening their first flowers this month include *C. japonica* "White Swan" planted on the centre bed near the South door, *C. maliflora* with small, double, rose-pink blooms of very neat appearance and the large-flowered *C. reticulata*, while several of the older varieties of *C. japonica* with regular-petalled double flowers will also be in bloom. *Loropetalum chinense*, a relative of the well-known Hamamelis, with white instead of yellow flowers, is planted near a large specimen of *Pomaderris elliptica* which regularly produces its creamy white blossoms during this month. Other plants of note include the fragrant pink-flowered *Luculia Pinceana* and many Heaths, Epacris and Correas in pots on the side staging.

Passing through the Wild Garden, where a fine specimen of *Mahonia japonica* is carrying many sprays of yellow flowers, we note the ever popular *Daphne Mezereum* opening its first blossoms, and shrubs of *Hamamelis japonica* var. *arborea* in full flower, with the paler yellow of *H. japonica* var. *Zuccariniana* just appearing on leafless twigs.

Two other early flowering shrubs planted here are the Japanese *Corylopsis pauciflora* with drooping spikes of scented primrose-yellow flowers and the taller growing *Stachyurus praecox* with pale yellow blossoms carried in a similar manner. Both may be damaged by severe frosts, but woodland conditions help to prevent the disappointment caused by the browning of the flowers.

One of the most dependable displays at this season is the collection of *Erica carnea* varieties now in full flower in the Heath Garden; no matter how severe the weather the buds survive unharmed and by a careful choice of varieties it is possible to have flowers for the first three months of the year from this species alone. One of the most striking is the March-flowering variety *Vivellii* with bronzy-red winter foliage and glowing carmine flowers. Also planted here and in other parts of the Gardens is the hybrid *E. darleyensis*, another very dependable early flowering plant. Ericas prefer an open situation and high exposed positions are no disadvantage. They flourish and flower freely in all parts of the country, provided the soil is suitable.

Returning through the Wild Garden we find the Rock Garden is slowly awakening to the spring; few flowers are yet in evidence but the early snowdrops, *Galanthus Elwesii* and *G. byzantinus*, and the Spring Snowflakes *Leucojum vernum* var. *Vagneri* and var. *carpathicum*

are already in bloom. Sheltered by the surrounding shrubs *Hepatica angulosa* is producing its clear blue Anemone-like flower, and the first blossoms are appearing on the dark green or silvered cushions of the early Saxifrages.

Near the Alpine House many Crocus species will be flowering to-towards the end of the month; and within many pans of bulbous subjects are already in full bloom; amongst these the small bulbous Iris are well represented, commencing with the clear violet-blue of *Iris histrioides*, soon followed by the dark purple with gold markings of *Iris reticulata* and its paler blue variety 'Cantab.' The smaller Narcissus in flower include, *N. asturiensis*, *N. nanus* and *N. calicicola*; while *Scilla Tubergeniana* with large lilac blooms and the vigorous Winter Aconite *Eranthis Tubergeniana* are both well suited to pot culture and reflect credit upon their introducers. The large collection of encrusted Kabschia Saxifrages will also be in flower including the many forms and hybrids of *Saxifraga Burseriana*; pink, white, and sometimes yellow flowers cover the cushions and seen on a sunny day the effect is most striking. Another outstanding plant which never fails to arouse admiration is *Saxifraga Grisebachii* with velvet crimson spikes rising from grey rosettes.

Towards the end of this month the first flowers will be seen on *Forsythia Giraladiana* planted near the Rose Walk, soon to be followed by the bed of *F. ovata* towards the top of the hill. *Prunus subhirtella* var. *autumnalis* also planted here, will probably make up a disappointing autumn display with a mass of spring flowers.

Round the Laboratory walls *Iris unguicularis* continues to flower and a small plant of *Viburnum foetens* has been producing its white, sweetly scented flowers since the new year. *Chimonanthus praecox* var. *luteus* is well set with buds which will be opening towards the end of the month.

The great activities in the Gardens during the winter are now nearing completion. In the Portsmouth Road Field a large number of ornamental Cherries have been planted, chiefly in two avenues, one continuing the broad vista over Battleston Hill, the other crossing it at right angles connecting at its eastern end with a new path encircling the hill. This latter development will not be completed until the autumn, but already a large number of tree stumps have been removed and the construction of a new bridge over the public footpath has been started. Planting in woodland, particularly woodland which has been cut over for timber in the past, requires careful preparation if the shrubs are to thrive, and before work commences the removal of the old stumps with all the roots possible is a necessity.

The Floral Trial Grounds have been dug and manured and the formal bedding in place of the old Rose beds appears very promising. The digging over and reseeding of the grass along this terrace should give a greatly improved sward. New grass pathways have been constructed in parts of Seven Acres and the Heath Garden, while a number of new beds have been made near the Rose Walk.

Every effort is being made to complete all new planting as soon as possible, as spring planting on light land subject to drought in May and June is not likely to give satisfactory results without the assistance of overhead irrigation.

BOTANICAL EXPLORATION IN MANIPUR

F. Kingdon-Ward, F.L.S., V.M.H.

DURING the late war in Asia, Manipur jumped from obscurity into the limelight, though the campaign there was of such a kind, that soldier naturalists had few opportunities to study the natural history of this region or add much to our knowledge of it. A brief sketch of some aspects of its botanical and horticultural exploration may therefore be of interest to readers of this JOURNAL, the more so as I was lately privileged to visit a part about which almost nothing was known. I must, however, preface my remarks with the confession that, writing far away from my library, I can give neither exact references nor the names of all plants I should like to mention.

Manipur is a semi-independent Hindu State, ruled over by a Maharajah. It lies amidst the frontier ranges between Assam and Burma, which both envelop and traverse it from north to south. Near the centre, in the very heart of the hills, is situated the plain of Imphal, 2,600 feet above sea level, a saucer-shaped depression with innumerable starfish-like arms gnawing covertly into the foot hills all round. This plain is largely cultivated, but it also contains several large *bhübs* or lakes and a number of swamps, marshes, water meads and so forth—home of *Iris Bakeri* Watt by the way—which suggests that the whole basin was formerly a lake bed. Two rivers, small as rivers go—or flow—in South-East Asia, break through the circle of hills in the south and west, the Barak and the Manipur; the latter may have drained the original extensive lake. In the north-east, but beyond the Manipur frontier is a third river, the small, swift, not unimportant Tizu, some of whose tributaries rise in the eastern ranges of Manipur. The superficial area of the state is over 8,000 square miles, that is a little larger than Wales; but this gives a very false idea of its real area or of the time it must take to explore it botanically. The highest peak is a little over 9,000 feet, but there are numerous peaks of 8,000–9,000 feet, especially in eastern Manipur. Just over the frontier in the north-east quadrant is the highest peak in the Naga Hills, over 10,000 feet high; and beyond that again is Saramati, over 12,000 feet. It must be understood, that Manipur lies only just outside the tropic between 24° and 26° North lat. Its climax vegetation is therefore evergreen or semi-evergreen rain forest and its flora predominantly Indo-Malaysian—except on the mountain tops where it becomes in part Sino-Himalayan. The climate is monsoon with heavy rain or continuous mist throughout the summer months, and fine dry winters, clear and cold. I interpolate here it is impossible to consider the flora of Manipur apart from that of the Naga Hills which surround the State.

The first important plant collections made in Manipur, appear to have been those of DR. (later SIR GEORGE) WATT and C. B. CLARKE, who were there in the eighties of last century—about sixty years ago. The latter collected chiefly round Kohima in the adjacent Naga Hills, and especially on the high peak called Japvo, but also along the Barak river in Manipur State and on the south-western ranges. WATT's main collecting area was probably around Imphal, but he too at one time

previous to CLARKE, followed the north to south bridle path (now a first-class M/T road) which passes through Kohima. Both botanists discovered many new species and threw considerable light on the distribution of floras in this region. Neither of them introduced any Manipur plants into cultivation.

Later CLARKE published an interesting account of his tour in the *Journ. Linnean Soc. Bot.* XXV, 1-107 (1889), illustrated with drawings of most of his new species. He would have included descriptions of WATT's new species also, had not the latter refused permission. No doubt, WATT intended to publish descriptions himself, but apparently he never did, and so far as I can discover, no complete account of his botanical work in Manipur has ever appeared. His new species were described gradually, mostly at Edinburgh by the late SIR ISAAC BAYLY BALFOUR and by PROFESSOR SIR WILLIAM WRIGHT SMITH.

Some time towards the end of the nineteenth century, Manipur became known as the home of many desirable Orchids, chiefly it seems as a result of collectors, who had travelled up the Chindwin river in Burma, sending natives into the hills which lay to the west. In this way, *Vanda coerulea* was discovered to be common here, as well as many fine Dendrobiums. However, I cannot recall any Orchid not even *Cypripedium insigne* entirely confined to Manipur, though several were no doubt originally discovered there. Nor, indeed, would one expect to find the Orchid flora at 2,000-5,000 feet different from what one finds in the surrounding hills. Though the range of many Orchids is restricted, it is not usually as restricted as all that; and some of the finest Manipur species, *Vanda coerulea* included, are found in Burma, far away to the east of the Irrawaddy river, in the Shan States and in Karenni.

Neither plant collectors (apart from commercial Orchid collectors and their agents) nor botanists have ever been numerous in Manipur, and though forest officers and others paid short visits and collected a few specimens, we hear little about the country during the first two decades of the twentieth century. After the first world war, DR. NORMAN BOR, C.I.E., of the Indian Forest Service did good botanical work in this region, but again for the most part just outside Manipur proper. The eastern half of the State has scarcely been touched yet. Although I visited Imphal in 1927 and again in 1935, my own earlier collecting hereabouts was almost entirely confined to the Naga Hills with several ascents of Japvo, just north of the Manipur frontier, which is phytogeographically all part of the same region.

In 1942, however, I spent six months in Manipur though I had no time to collect plants. I was, nevertheless, able to make notes on the flora while travelling on foot over the hills and by boat on the Barak river. Finally, in 1946, I visited Ukrul and for the first time climbed a relatively high hill on the eastern range, and made a collection of seeds in Manipur. Of WATT's plants—and he collected a considerable number—I know very little. The specimens, I believe, are at Edinburgh. He discovered, but did not introduce, the Iris named after him by BAKER. This *Iris Wattii* was afterwards found to be fairly widespread and is looked upon by connoisseurs as a good plant, if doubtfully hardy. He

may also have discovered the Iris, which he himself named after BAKER, and many other plants.

On my earlier visits to Imphal (December, 1927 and April, 1935), I was favourably struck by several plants—the little blue-flowered *Clematis Cadmia*, an almost herbaceous species, which grows in the bushes along the banks of the irrigation canals, *Iris Bakeri* already referred to as growing in the water meadows and a small-flowered very spiny little Rose like *R. bracteata*. All these I tried to introduce and failed. However, as I was at the same time getting *Rhododendron Elliottii* and *R. Macabeaumum* from the Naga Hills, this did not matter very much. I do not know whether these last named grow in Manipur, but *R. Elliottii* ought to—indeed it is one of WATT's discoveries. The one peak of over 9,000 feet inside Manipur State is still virgin territory.

In December, 1942, I was employed by the Government to carry supplies from Assam across the frontier into Burma and I spent the next six months off and on in South-West Manipur. From Sitchar I hired country boats for the journey up the Barak to a river confluence at the place where the Lushai Hills meet the Manipur frontier. Here I established my base camp. A bridle path climbs 3,000 feet up to the hill tops, on which are perched the Kuki villages. And from here, I organised coolie transport over 75 miles of switchback mountain trail, to one of the Burma garrisons. On the long marches—I covered over 500 miles on foot—I was able to make many observations on the flora.

The four days' voyage up the Barak was lazy and pleasant, except for the thick woolly wet mist which shut down on us like a lid after dark, sometimes not lifting till ten o'clock in the morning. At first the river was broad, the current sluggish and we made fair progress. Above the high mud banks were Tea gardens. Presently, we passed a sandstone cliff, covered in part with jungle, and shortly afterwards we reached the only known locality for the beautiful little *Cypripedium Spicerianum*. I did not go ashore to hunt for it, however, as it would have taken too long. A Tea planter of my acquaintance whose garden is near this *locus classicus* has a dozen plants growing well in pots, but it is not often seen, even in Assam. On the cliff, I noticed high up hanging in festoons from the trees, the Rhododendron-like white trumpets of *Beaumontia grandiflora*, an evergreen climber, very free flowering, often seen in Indian gardens—one of the comparatively few indigenous climbers thought worthy of cultivation. A species of *Chonemorpha*, another Apocyan climber with smaller, but nevertheless large flowers, is also commonly met with in these hills, but very rarely cultivated. In North Burma, I once came across a species—perhaps a variety of *C. macrophylla*, the common East Indian species—with lovely rose pink flowers. My attempt to introduce it into Singapore failed, possibly because the seeds were not sufficiently ripe.

Other trees on the sandstone cliff were the scarlet-flowered *Erythrina* and *Bombax malabaricum*; a climbing *Bauhinia* with cream-coloured flowers was also conspicuous.

Beyond the Tea gardens the country was wilder, with few riverside villages. High grass alternated with bushy scrub and forest. As we entered the Manipur hills, progress against the current became slower.

The mud banks changed to rock with islands of sand or shingle and an occasional rapid. An interesting shrub association clothed the rocks below high water mark, comprising gnarled species of *Ficus* (*F. pyriformis* and *F. heterophylla*), two species of *Eugenia*, a *Glochidion*, and even a species of *Litsaea* (*L. angustifolia*). Several of these shrubs have narrow linear leaves, which seems to be an adaptation to—or the result of—temporary submergence during the rainy season.

The Barak, still less than 500 feet above sea level, winds far into the hills which, at a confluence called Tuivai Mukh, rise abruptly above it to a height of over 4,000 feet. The lower slopes are often covered with dense Bamboo growth, with here and there an Orange grove. Most of the population live on the hill tops, where they make temporary clearings. Although, as seen from the gorge of the Barak at least, the population of Western Manipur appears to be extremely sparse, much of the forest has been cleared and it is only in the river gorges, in deep gullies and on sunless north slopes, that one finds anything like the original climax evergreen rain forest. Nevertheless, in the course of my journeys I went through some fine patches of jungle and marvelled at the exuberance and variety of the woody vegetation between 500 and 4,000 feet altitude.

A very striking tree at the lower levels was *Sterculia alata*, odd specimens of which grew on the rocky slopes just above the river. It is a strapping giant with a straight white trunk like a Doric column, ending in a compact crown of foliage supported by a few short stout branches. The large woody capsules identify it immediately. There are many handsome *Meliaceae*—one suspects this family directly one sees large pinnate leaves in the canopy overhead. I noticed, particularly, a species of *Chisocheton*. *Terminalia myriocarpa* is another grand tree, especially in half ripe fruit with thousands of red tassels, each composed of tiny samaras swinging from the twigs. A small tree *Crataeva religiosa*, covered with white flowers, later turning yellow in March or April also grows along the valley bottom. The long exerted purple stamens, borne on a column at the base of a slender gynophore which likewise hoists the ovary, gives the flowers a very curious and characteristic appearance. It is closely allied to *Capparis*.

Many strangling Figs, species of *Garcinia*, *Talauma Hodgsonii*, *Magnolia* and other *Magnoliaceae*, *Quercus semiserrata*, slender climbing palms (*Calamus*), Screw Pines (*Pandanus*), Toon trees (*Cedrela Toona*), several handsome Laurels (*Beilschmedia*), *Rubiaceae* (*Sarcocephalus*), the deciduous *Spondias* or Hog-plum and Sago-palm (*Caryota*), are a few common trees met with. On sunny south and west slopes above 3,000 feet in April and May *Bauhinia variegata* leafless and smothered with purplish white butterfly-shaped flowers vied with the orange scarlet of *Sterculia colorata* equally naked. Here also, *Gmelina arborea* was flowering, with a creamy white tree Composite (*Vernonia*).

The jungle was full of big lianas, amongst which *Sphenodesme*, *Fagraea*, *Entada scandens*, *Hippocratea* with its curiously distinct coriaceous carpels, *Aristolochia* and *Roydsia* (one of the few scandent *Capparidaceae*) were noted, besides *Buettneria*, a much tangled liana. At 3,000–4,000 feet several *Anonaceae*—shrubs with long slender

scarlet pod-like fruits sometimes constricted, species of *Goniothalamus*—and *Uvaria*, attracted my attention and a beautiful deep red Vanda-like epiphytic Orchid with flowers 2 inches long. There were several Oaks on the hilltops, *Q. Griffithii* and others, and red barked Birch. At 5,000 feet, I found a solitary *Rhododendron* not of flowering age. Other shrubs I found in flower and tried to identify were *Pavetta indica*, *Canthium*, *Clerodendron nutans* (easily recognised in fruit), a queer *Grewia*, *Itea*, *Pottingeria* (Saxifragaceae) and *Saraca indica*, its deep orange flowers with crimson stamens bursting out all along the branches in compact bunches.

One of the most interesting plants I found low down, was the shrub Orchid *Vanilla planifolia*, its long stems climbing many yards up the trees amongst which it grows bearing large green flowers (the tip purple). The stem is fleshy and jointed. At each node is a solitary leaf, also fleshy, and from the opposite side springs a root. From the lower nodes these roots go down to the soil, but the upper ones appear to be stem clasping. The flowers are borne in fascicles on porcelain white pedicels.

I have already remarked, that Manipur has long had a great reputation for Orchids and I found this corner of it no exception. Many beautiful *Dendrobiums* and other genera flowered in the hot weather. But, I was even more struck by the variety and number of birds, while the Barak river itself was a veritable zoological garden, in which you might see porpoises, otters and 15-foot crocodiles (gavials)—the latter only when they were sunning their ugly length on the hot sand banks. Small tortoises sunbathed on the rocks, squirrels played in the trees, three species of monkey were quite common, jungle fowl and pheasants strutted about arrogantly and called peremptorily from the Bamboo groves. As for fish, there were plenty of these—and plenty of birds—herons, cranes, eagles, kingfishers—trying to catch them. Lest anyone should comment that this has nothing to do with the flora of Manipur, I hasten to add that, the field botanist if he is wise will know at least something about birds and something also about insects, both of which classes are of great importance in ecological studies. There are endless interactions between plants, birds and insects and to know something about one of these and nothing about the other is to get a lop-sided view of nature. Birds for the most part, feed on worms, insects, fruits, seeds and flower-buds and the insects are often obtained as the flower peckers, spider hunters and many other birds obtain them, from flowers which the birds unconsciously pollinate.

That the flora of Manipur is very like that of the Naga Hills is hardly open to question and nothing is to be gained by trying to keep them separate. The same is true of the Lushai and the Chin Hills—all are part of one phytogeographical whole. Unfortunately, we know so little of any of these areas that species new to them are continually being found in one or the other, which is the reason why we continue to regard them as separate units. Sub-divisions, if any, are not likely to follow political boundaries, but will follow altitude, and may be as well marked within one area as between any two political divisions. Thus, any moderately high peak may have its endemic species, as

I discovered, when in 1946, I ascended Sirhoi, 8,420 feet in eastern Manipur. Here, for the first time in Manipur State, I met with a sub-alpine flora, more pronounced than on Japvo, in the Naga Hills, 1,500 feet higher, but closer to the hot plain of Assam.

I went to Manipur to look for three United States aircraft, which had been lost in the mountains around Imphal during the previous year's operations. From Imphal, I drove up to Ukrhul by the rough winding road, very steep in places. The first 15 miles lay across the plain where, in the small Manipuri villages one sees many introduced as well as native trees and shrubs, *Ficus religiosa*, symbol of Hinduism, planted everywhere, *Parkia*, *Grevillea*, the yellow Oleander-leaved *Thevetia*, hedges of *Euphorbia*, Century plant and so forth. Once in the hills, however, though transformation of the vegetation is common enough, introduced trees are rarer. However, one of the principal crops—Tea—is perhaps an alien. After crossing the Tobal river we began to climb in earnest and by midday were 5,000 feet above sea level. Here, many trees were seen, including the thorny *Pyrus Pashia*, more than half disrobed, and what remained of its foliage ragged and purple stained with bunches of spherical potato-brown fruits dangling; the very English-looking willow *Salix tetrasperma*, *Embllica officinalis*, with hard spherical fruits like small shining Greengages—or green marbles; *Ficus Cunia* with leaves reminiscent of some Begonias; *Engelhardtia spicata* which, unlike its near relative and neighbour the Walnut and its more distant (in space) cousin, the Hickory, is evergreen, or almost so, the wind swishing its many fat green brushtails, made up of papery winged fruits. No sooner had we reached 5,000 feet, however, than we had to descend 2,000 feet to cross another valley, after which, we climbed steadily to Ukrhul. Here we came into Pine-Oak-Alder woodland where I noticed a very prickly—almost bristly, so fine were the prickles—Rose bush with tiny smooth fruits. It was some time before I secured a little seed. Pines, I found, do not ascend much above 6,000 feet and the Ukrhul mountains though topping 8,000 feet are not high enough for other Conifers, except an occasional *Taxus*. The Pine, by the way, is not *P. excelsa* but *P. khasya* (= *P. insularis*).

Some slopes below the Ukrhul ridge are thickly overgrown with shrubs and small pollard trees, chiefly Alder, brought about by wood cutters seeking firewood. Here are found *Viburnums*, *Rubi*, *Buddleia*, *Osiris arborea*, *Eurya*, *Pieris*, *Indigofera*, *Litsaea*, *Wendlandia*, various *Araliaceae* and many others; climbers such as, *Clematis*, *Dioscorea*, *Smilax*, *Dumasia*, *Vitis*; and in glades and clearings, herbaceous plants such as small *Acanthaceae*, *Cyperaceae*, grasses and so forth. The professional plant collector is not likely to find anything new of first priority hereabouts—though you never know.

From the horticultural point of view, it is the sub-alpine flora between 6,000 and 8,000 feet that is more interesting. Some of the surrounding peaks are calcareous, and their south and west slopes have been burnt for generations, allowing a herbaceous flora of perennials with deep root systems, bulbs, rhizomes or tubers, to get ahead. There are also a few annuals.

In the course of my search for one of the lost aircraft, therefore,



FIG. 13 A species of *Calamus* in the Manipur Hills



BOTANICAL EXPLORATIONS IN MANIPUR

FIG. 14—Manipur and Naga Hills Fording a river on the way to Saramati



BOTANICAL EXPLORATIONS IN MANIPUR

FIG. 15—Evergreen jungle hill in Manipur. The scenery at 3,000 ft is beautiful with a great variety of big trees.



BOTANICAL EXPLORATIONS IN MANIPUR

FIG. 16—Assam Frontier. Bruhmit tree in flower. April. In the hot weather the dry southern slopes of the hills are gay with flowering trees of all colours, many of which are leafless and a sheet of blossom.



Photo D111 H. F. U.

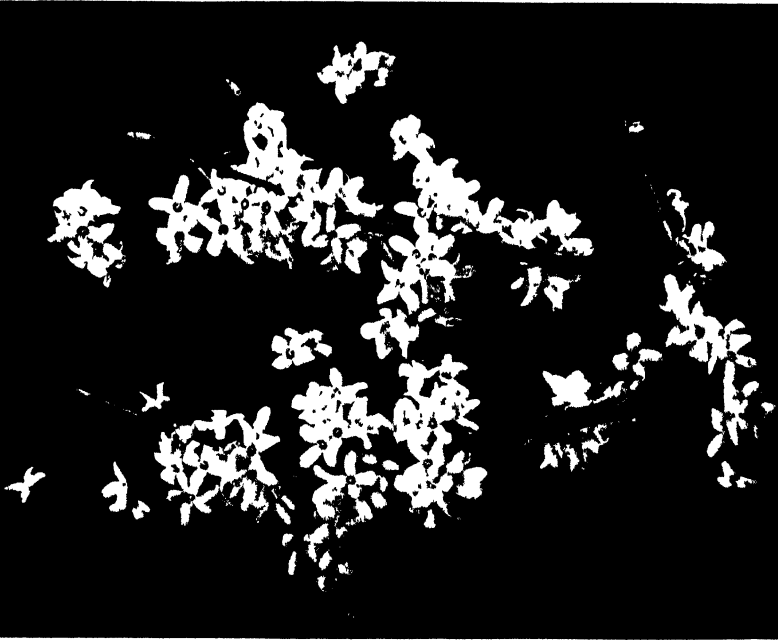
FIG 17—*Nomocharis Farreri* and *N. pardanthina* at Devonhall in Fifeshire (See p 46)



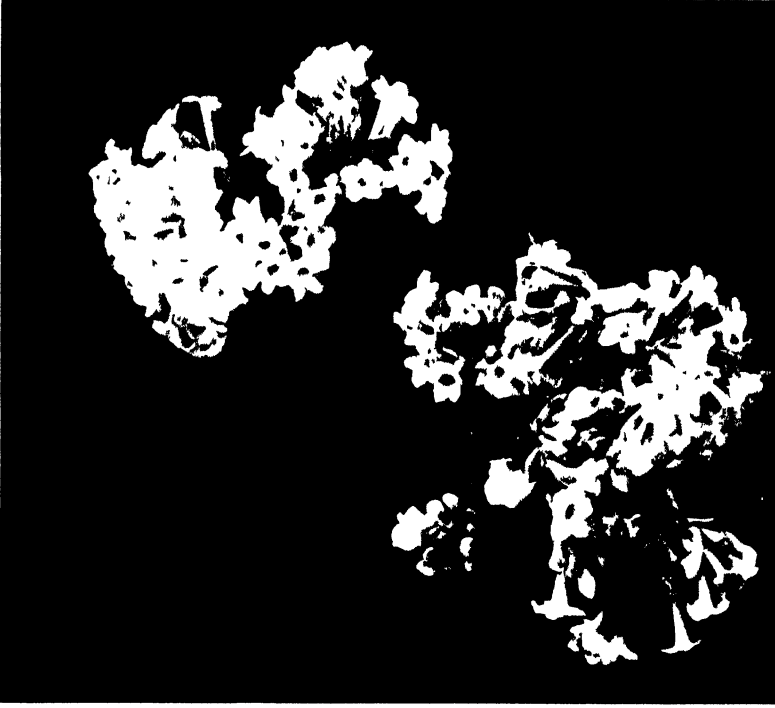
Photo, R. A. Malby

FIG. 18—Nerine 'Lionel' A.M. (See p. 28)

The Sander Medal for best new greenhouse plant of general utility shown to the Society during the year was awarded to Major E. de Rothschild for this Nerine



AWARD OF GARDEN MERIT
FIG 19—*Forsythia xerata* (See p 48)



REGINALD CORY MEMORIAL CUP 1947
FIG 20—*Viburnum bodnantense* A.M. (See pp 44, 50)



FIG. 21—*Eutonynus semierectus* A.M. (See p 47)



VICTORIA MEDAL OF HONOUR, 1947
FIG. 22—Mr. W. Clark



Photo Wychham Studios

FIG 23—Mr A Simmonds



Photo Lintyk

FIG 24—Dr P L Giuseppe



Photo George Roper

FIG 25—Mr W J Mitchell



Photo Anne Wallworth Ltd

FIG 26—Mr J S W Cracknell

VICTORIA MEDAL OF HONOUR, 1947

I ascended to the top of a mountain visible just across a valley from Ukhul. Above 6,500 feet, or thereabouts, the sheltered north face was covered with forest, the trees often gnarled and rather stunted. I had little time to pay attention to this, however, nor did I try to penetrate it. Beyond, noting a few oaks, Magnolias, Schima, Berberis (Mahonia) with a lot of Arundinaria and Daphne undergrowth and two small tree Rhododendrons, *R. arboreum* and another with bullate leaves (Series *Maddeni*, Subseries *Ciliicalyx*), I left it alone, though it quite possibly contained trees and shrubs of more than passing interest. (I did, however, collect seed of the Maddeni Rhododendron.)

Amongst promising plants of which seed was obtained growing in the open were: a species of *Nomocharis*, which is not *N. pardanthina*, (and not, it seems, from a description of a flowering plant lately sent to me, a true Lily), two species of *Iris*, one of which has recently flowered in Assam, said to be very beautiful, the other quite good (it is not, as first suspected, *I. kumaonensis*), an *Allium*, a species of *Onosma*, a twining Aconite, a second rather burly Aconite with a compact many flowered raceme, probably *A. nagarum* and a frail looking *Delphinium*. To give some idea of the mixed herbaceous flora on this grassy slope, I might mention that there were also species of *Pedicularis*, *Commelina*, *Swertia*, *Gentiana*, *Habenaria*, *Campanula colorata*, *Androsace* (on the edge of the forest in shade; probably *A. Henryi*), several unrecognisable *Compositae* and *Umbelliferae*, and no doubt several annuals of which in January there was as yet no trace.

It would obviously be worth while to pay a visit to this mountain in early summer and see some of these plants in bloom.

Of the plants I saw, one of the *Iris*es may possibly grow in the Chin Hills, near Fort White, a little farther south. The *Onosma* grows on the top of Japvo, but is not in cultivation. The other *Iris*, 'Maddeni' *Rhododendron* and *Nomocharis* are probably new. As for the Japvo *Rhododendrons*, *R. Macabeanum*, *Elliottii*, *Johnstoneanum* and others, I saw no sign of them. It would seem as though the topmost flora of these summits, less than fifty miles apart, is somewhat different; which leads one to suspect that the flora of higher peaks in eastern Manipur is still more different. As to the highest peaks, Saramati, over 12,000 feet and Dapha Bum over 15,000 feet, a rich harvest surely awaits the botanist who can reach those difficult mountains. But these high peaks are not in Manipur, though they *are* within the same phytogeographical region. Saramati is on the same range as Sirhoi. A photograph of its summit, taken from the air, shows an unmistakable alpine flora, with scrub *Rhododendron* and alpine scree vegetation. The highest trees appear to be Silver Firs, mixed with bush *Rhododendrons*. One can indeed picture almost any Alpine growing here, though imagination is not likely to outstrip reality.

NEW AND NOTEWORTHY PLANTS

Viburnum × *bodnantense*

VIBURNUM BODNANTENSE is a hybrid made at Bodnant about thirteen years ago, between *V. fragrans* and *V. grandiflorum*, the first-named being the seed parent.

As a garden plant it much more nearly resembles *V. grandiflorum*, but it has a vigour to which the latter plant is apt to be a stranger. *V. grandiflorum* has the curious habit of sulking, perhaps for two or three years, with a growth only a few inches long, and it is apt to look stunted and poor, at any rate in the North Wales climate.

The hybrid, however, is a robust and rapid grower, and always manages to look in good health. One small layer of 12 inches in height put on, this year, a five foot growth, in a very dry and unwatered bed, while older plants are already 12 feet high.

The leaves are very like those of *V. grandiflorum* and much more handsome than those of *V. fragrans*. The flowers are rather larger than those of *V. fragrans* and are more pink; they are strongly fragrant.

The flowers of *V. bodnantense* begin to open at the end of October, and fresh trusses keep coming out for very many weeks, selecting milder spells to open but when open disregarding the vagaries of the weather.

The flowers are wonderfully resistant to frost, as are those of the parents, and the flowering branches of *V. bodnantense*, which received an Award of Merit when shown at Vincent Square in December, had been cut after a couple of nights of ten or eleven degrees of frost. The hybrid sets seed, although not very freely, but can be increased most readily from layers or from cuttings rooted with or without heat. (Fig. 20.)

ABERCONWAY

EDITOR'S NOTE.—The Reginald Cory Memorial Cup for the raiser of the best new hardy hybrid of garden origin shown to the Society in the course of the year was awarded to LORD ABERCONWAY for *V. bodnantense*.

NOMOCHARIS*

David Wilkie

(A summary of a lecture given on July 1, 1947, COL. F. C. STERN, F.L.S., V.M.H., in the Chair)

THE genus *Nomocharis* was known to scientists as far back as 1883, but it was not until about a quarter of a century later that they flowered in this country. The first species to be named was *N. pardanthina* which had been collected by DELAVAY in 1883 in Western China; it was this species that first flowered in this country. In the same year, 1914, *N. Mairei* flowered at the Royal Botanic Garden,

* A fuller account of this genus by Mr. D. Wilkie may be found in the *Lily Year Book*, 1946.

Edinburgh, and other gardens, from seed sent home by the late GEORGE FORREST.

These two species rank as the finest in the genus and their introduction caused quite a sensation. In later years, other species were brought home by WARD, FORREST, FARRER and other collectors, making the total number of species over a dozen, while several of them have forms and varieties. It is to be regretted that one or two of them were never successfully raised in this country, but it is not too much to hope that in the future some collector may send home bulbs or seed again. Unfortunately, during the war, certain forms and species may have been lost. The genus is distributed in the Himalayas and in China.

The genus can be divided into three very distinct sections, namely, OXYPETALA, EUNOMOCHARIS and ECRISTATA, the points of difference being the presence or absence of crested glandular bases and the slender or inflated bases to the filaments.

In the section ECRISTATA, the segments may have glands but they are not crested nor fringed and have slender filaments to the stamens and include *N. aperta*, *N. Georgei*, *N. Henricii*, *N. saluenensis* and *N. Souliei*; all of which are in cultivation except *N. Georgei*.

It is in the section EUNOMOCHARIS that the crested glands and inflated filaments are most pronounced and include *N. basilissa*, *N. Farreri*, *N. Mairei*, *N. meleagrina* and *N. pardanthina*, all of which are or have been in cultivation.

The remaining section, OXYPETALA, has the inner segments crested or fringed but without the inflated bases to the filaments of the previous section, and includes *N. euxantha*, *N. lophophora*, *N. nana* and *N. oxypetala*. Of these only *N. euxantha* has not been in cultivation; *N. euxantha* is very similar in many ways to *N. nana*, but the foliage is shorter and broader and is overtopped by the flowers. The others are:

N. nana, a native of the Himalayas, which has a wide distribution. It is a small plant varying in height from 6 to 16 inches and also varying in colour from pale lilac to deep purplish-brown, the latter shade being the most common. Some time ago, there was a yellow-flowered plant found with all the characters of *N. nana* but with yellowish blooms; this is now kept as variety *flavida*.

N. lophophora is perhaps more odd than beautiful, yet it has an attractive way of keeping the points of the segments attached together and forming a Chinese lantern. It is a taller plant than *N. nana*, and the flower colour varies from bright yellow to greenish-yellow or cream.

N. oxypetala is a more robust and stronger plant than any of the foregoing. It is a native of the Himalayas, and has yellow or yellowish flowers but they are larger than the others in the section and more open.

In the following section the characters already referred to will be readily seen in the flowers, and it is in this section that the most beautiful plants are seen.

N. basilissa. Those of you who have read the late REGINALD FARRER'S description will remember how he described it as a pure luminous scarlet, unspotted, like nothing so much as some wonderful strain of *Papaver orientale*. In the article I wrote in the *Lily Year Book* in 1946,

I was not aware that this species was in cultivation. Since then I have seen it growing in MRS. STOKER'S garden.

N. Farreri. Another of FARRER'S collecting is the species which bears his name, *N. Farreri*, a species near to *N. pardanthina* but with narrow leaves, entire or almost entire inner segments, white or very pale pink flowers with purple markings. It is a stately plant and a robust grower. (Fig. 17.)

Very like *N. Farreri* is:—

N. pardanthina, the flowers of which are pale pink, heavily spotted towards the base of the segments with purple; and the inner segments are fringed at the margins and all the segments are broader with a very prominent double midrib. Like the others this species is very variable in colour and spotting but the spotting is confined to the base of the segments. Under cultivation, pure white forms have been found.

Closely allied to *N. pardanthina* is:

N. Mairei. In this species the spotting varies in depth as also does the colour. The spotting is spread all over the six segments with a pink background. The margins of the inner segments are very fringed and they are usually broader than long. In appearance the flower is more open than *N. pardanthina*: it is practically flat. There are two distinct forms, namely:

N. Mairei leucantha, where the perianth is white or whitish and with the spotting heavily marked throughout the segments; also the tops of the inflated filaments are whitish and not the same colour all over.

The other form is:

N. Mairei candida. In this form the perianth is without any spotting, pure white, with only colour at the fringed glands at base.

The remaining species:

N. meleagrina, has entire inner segments, much narrower than *N. Mairei* and with spotting throughout the whole flower. This one has been in cultivation but I have no knowledge if it still is.

In the last section, ECRISTATA, there are one or two very good plants, such as:

N. aperta, a wide, saucer-shaped flower, pink throughout with marked blotches of crimson purple, with narrower segments than *N. Mairei* and without the fringed margins to the inner segments. There is a strong basal gland but it is not fringed.

Like it in growth is:

N. saluenensis, a very hardy grower with saucer-shaped flowers, pale to deep rose-pink with a marked crimson-purple circle and often with a tinge of yellow round it. The flowers sit upwards in *N. saluenensis* while in *N. aperta* they are more inclined to hang downwards.

The latest to flower is:

N. Henricii, a plant which sometimes reaches over 3 feet in height. The segments are narrow, white, with a deep crimson-purple blotch at base of each segment, which forms a definite circle of colour. There is a form with only spotting at base and not the very marked circle of colour as usually seen. At the base there is a pouch and the flower is more trumpet-shaped.

That now only leaves:

N. Souliei, a species that has never settled down in cultivation, as far as I have seen it. The stems are only about 8 inches high, although it is said to be taller than that in the wild. It bears a solitary large flower of deep wine purple; and

N. Georgei, a species I do not think has ever been in this country. It is also of a deep wine purple growing upwards to about 12 to 15 inches.

Since the introduction into gardens, several species have already hybridized, and a few of the resultant crosses have shown greater vigour and are well worth attention. In some cases the actual parents are unknown, and with the breaking up of characters, it is almost impossible to be accurate as to the parents.

There is no doubt that *N. aperta* is one of the parents of more than one of these hybrids, and another lovely hybrid is a cross between *N. pardanthina* and *N. Mairei*, the colouring of which is similar to *N. pardanthina* but with the wide open flower and segments of *N. Mairei*. One that I photographed is probably a *N. saluenensis* cross with the blooms sitting up like *N. saluenensis*.

The question of hybrids brings me to their propagation. Most of the genus will propagate from scales in the same way as Lilies. Seed, as a rule, is produced very freely and they are not difficult to germinate. At Edinburgh, we leave the seedlings to grow in the seed-pans or boxes until they have made their growth. During this period, the pans are in a frame or cool greenhouse, but when the bulbs have gone to rest, they are put into a cold frame. Often the seedlings are kept in the pans for two seasons, only being given a top dressing in the spring before growth starts; if not, they are put into other boxes in fresh soil, and kept growing indoors. When planted in their permanent quarters the whole receptacle is emptied and not separated. This does help as they do not like root disturbance.

In the north we do not require to plant in shade, although we like to have a ground covering of some small shrub. *Nomocharis* require plenty of moisture during their growing season, but they also like good drainage.

To conclude, I would state that it is not a difficult genus to grow, and any attention given is amply rewarded by the beauty of such species as *N. Mairei* and *N. pardanthina*.

EUONYMUS SEMIEXSERTUS

OF the many species of *Euonymus* native to N. America and Asia a goodly number have found their way into English gardens. The evergreen *E. japonicus*, in both green-leaved and variegated forms, is an excellent plant; but it has been used so freely in some places, especially near the sea, as to become monotonous. *E. Fortunei*, including the trailing variety *radicans* and its variegated form 'Silver Queen', often wall-trained, is also familiar.

From the deciduous species, a selection can be made to suit a garden of any size. Their chief attraction lies in the fruit, usually a four- or five-lobed, and sometimes winged, coloured capsule opening in early autumn to reveal the seeds, which are covered by a fleshy skin or aril often of contrasting colour. The common Spindle-tree of our English hedge-rows, *E. europaeus*, is a characteristic example. In cultivation it has produced forms varying in the colour of the fruit, the size and shape of the leaf and the habit of the bush. As in most other deciduous species the leaves of the common Spindle-tree colour more or less brightly before falling, the ripe fruits remaining to adorn the leafless, green twigs.

E. semiexsertus, a Japanese species, is worth noting for the long duration of its fruits, which are at their best in early November and hang in good condition until December is well advanced. The capsule is at first green, later becoming whitish-pink and finally deep rose-pink. The aril is deep orange-red, much split and exposing a part of the blood-red seed. The specific epithet is given in allusion to this character. At Wisley the plant takes the form of a somewhat spreading bush or small tree about fifteen feet high, clothed in the summer with oblong, or lanceolate-oblong, crenate-serrate leaves which assume a pale pinkish coloration as they age. (Fig. 21.) It was given an Award of Merit when shown on December 2, 1947.

AWARD OF GARDEN MERIT LXXXI

388 FORSYTHIA OVATA

Award of Garden Merit, June 2, 1947

THIS is one of the earliest Forsythias to flower each year, being only preceded by *F. Giraladiana*. Although not so conspicuous as the later flowering hybrid *F. intermedia* var. *spectabilis*, its early flowering habit makes it a most valuable plant. It is a deciduous shrub reaching six feet or more and should be grown in a sunny open position, if possible where the flowers may be seen to advantage against a background of evergreen. It is named from the ovate shape of the leaf. The flowers are bright yellow and are borne in pairs at each node on one- or two-year-old wood up the stem or on short spur shoots. The corollas are four-lobed and up to three-quarters of an inch in width.

This Forsythia is a native of Korea. It was described and named by the Japanese botanist NAKAI in 1917 and collected by WILSON in the following year and introduced by him into cultivation. It was figured in the *Botanical Magazine*, Vol. 159, tab. 9437. This Forsythia can be distinguished from other species of the genus by the broad ovate leaves and the colour of the young shoots which is a pale yellowish-brown grading to greyish-brown. It is very hardy and often begins to flower at the end of February or early in March. (Fig. 19.)

PLANTS TO WHICH AWARDS HAVE BEEN MADE IN 1947

Brassolaeliocattleya 'Denham' var. 'Majestic' A.M. December 2, 1947. The robust plant bore a couple of large flowers, the sepals and petals rosy-mauve, the expansive labellum crimson-purple. The result of crossing *Bc.* 'Dr. G. Macdonald' with *Lc.* 'Britannia.' Exhibited by Mr. Clint McDade, Chattanooga, Tennessee, U.S.A.

Laeliocattleya 'Golden Radiance' A.M. December 2, 1947. A showy hybrid between *Lc.* 'Fulva' and *Lc.* 'Golden Gleam.' Flowers of medium size, the sepals and petals orange-yellow, the labellum with a reddish apex. Raised and exhibited by Messrs. H. G. Alexander, Ltd., Tetbury, Glos.

Odontioda 'Wedding Bells' A.M. December 2, 1947. The spike bore seven well-formed flowers of bright crimson colour, the labellum having a rose-coloured apex and a yellow crest. The result of crossing *Oda.* 'Topa' with *Oda.* 'Chantos.' Raised and exhibited by Messrs. Charlesworth & Co., Haywards Heath.

Rose 'Our Princess' A.M. July 1, 1947. A vigorous and very free flowering hybrid polyantha variety raised as the result of a cross between 'Donald Prior' and 'Orange Triumph.' The bright crimson semi-double flowers measure $2\frac{1}{2}$ inches across. Raised and shown by Mr. H. Robinson, Victoria Nursery, Burbage, Hinckley, Leicestershire. This plant was shown under the name 'Crimson Glow' but as this name is already in use for a Rose it has now been changed. (See vol. LXXII, p. lxxii.)

Salvia Pitcheri 'African Skies.' A.M. September 23, 1947. This very useful late-flowering variety of a North American species was raised by Mr. A. C. Buller of Stellenbosch and exhibited as 'Buller's Variety.' It is a herbaceous plant about 3 feet tall, with linear-lanceolate leaves about 3 inches long. The stems are copiously branched near their tips and bear spikes of Gentian-blue (H.C.C. 42/2) flowers each 1 inch long. Exhibited by J. Elliott, Esq., Broadwell Nursery, Moreton-in-Marsh, Gloucestershire. (See p. ii.)

Sophrocattleya 'Peach Blossom.' A.M. November 4, 1947. A pleasing little hybrid. The spike bore two flowers, each about 4 inches across, salmon colour, the labellum having a golden-yellow throat. The result of crossing *S. grandiflora* with *C.* 'Remy Chollet.' Exhibited by Messrs. Sanders, St. Albans.

Sorbus × kewensis. A.M. October 21, 1947. A very fine Mountain Ash, believed to have originated in a cross between *S. pohuashanensis* and *S. Esserteauiana*. The branches exhibited bore immense bunches of medium-sized, sealing-wax red, semi-globose berries, and leaves composed of fifteen lanceolate leaflets with finely and evenly serrate margins, rich green above and finely downy beneath. Exhibited by the Director, Royal Botanic Gardens, Kew. (See p. viii.)

Symplocos paniculata. A.M. October 21, 1947. A small Himalayan and Chinese deciduous tree with shortly-stalked elliptic leaves 2 to

BOOK NOTES

"The Flowering Shrub Garden." By Michael Haworth-Booth. 2nd ed. 172 pp. Illus. 8vo. Country Life. 25s.

Many keen gardeners will welcome a new and enlarged edition of this enthusiastic and charming book. Many new photographs have been added and we have already had an opportunity of reproducing several of the most noteworthy in the JOURNAL. In addition a generous series of colour plates have been added. In these days of labour shortage and rising costs, the garden of Flowering Shrubs and especially the Woodland Garden is the form of gardening which is most closely associated with this century and, as the author remarks, the Woodland Garden with choice Rhododendrons has taken the place of the Orchid House of the previous century.

New material has been added on Hydrangeas and on some more recent Rhododendron hybrids, while several of the recommendations for more delicate shrubs, which have not survived the war years, appear to have been deleted. An Index has been added giving in many cases the authority for the species or the raiser of the hybrid. Mr. Haworth-Booth has a valuable gift for stimulating our enthusiasm for his favourites and these are generally very good, while he also has the eye of an artist in their placing and arrangement and as such is able to make us see our plants in a new light and to help us to place them to the best advantage. He rightly insists that the good gardener must be a combination of two personalities, the artist and the cultivator, and that each shrub shall be so grown as to display the natural characteristic form of its particular species. Throughout the book the emphasis is on a natural garden and a garden which will carry a long period of interest. Foliar characters are stressed as much as floral, while the value of flowering shrubs covering the mid-summer period should tempt us to plant a shrub garden that will have flower and interest from April till September. I only wish that he had dealt also with winter flowering plants.

P. M. SYNGE

"Modern Gardening." By J. S. Dakers. 504 pp. Illus. 8vo. (Cassell.) 21s.

If I had to choose a book for a friend keen on horticulture who wished to obtain more knowledge of all-round gardening, I would not hesitate to name *Modern Gardening* by J. S. Dakers.

Written primarily for the amateur in an understandable way, its 496 pages contain all that is necessary to assure success of most gardening efforts.

The 64 pages of illustrations, including some from the Royal Horticultural Society's Handbook *The Vegetable Garden Displayed*, are excellent.

The chapters on "The Greenhouse," "Flower," "Fruit and Vegetable Gardens," are sensibly practical with unlimited information.

Trees and shrubs, including Conifers, Climbers and hedge plants (now most important in "Modern Gardening") might have been allotted more than the small quota of 66 pages.

Many lovers of the Mahonia section of Berberis will not agree with the author's statement on page 252 that "*Mahonia Bealei* is an even better variety with more spreading plumes of flowers than *M. japonica*."

Actinidia chinensis is dismissed with mention only of its flower and none of its edible fruit, while the little paragraph on Camellias proves that the writer is not yet convinced of the hardness of this family of evergreen plants.

Magnolia Nicholsoniana should now read *M. sinensis*, nor is *M. Soulangeana* a species.

The wide scope covered by the book and the excellent manner of its arrangement makes it well worth its full price. This book will be of great service to the horticulturist on all subjects of gardening.

FRANCIS HANGER

"Annuals for your Garden." By Daniel J. Foley. 96 pp. Illus. 8vo (Macmillan & Co., New York.) Available through Macmillan & Co., Ltd., London. 5s.

For American readers this book might be of value but it is doubtful if it is of any great value for the average English amateur gardener. Some of the illustrations are good and attractive and at the price it is doubtful where we can equal them in England to-day, although in some cases the colour arrangement and grouping of the flower spikes are worthy of better care. For example, in the coloured picture of spikes of *Antirrhinum* the spikes are thin and of poor shape and could have been chosen with more care. The picture of blue *Ipomoea* 'Morning Glory,' however, is really lovely as also are several others. The notes on the use of annuals are rather sketchy and being intended for American readers are of less use to gardeners in this country. However, the descriptions of some of the plants are good and the book has the advantage of reminding gardeners of some most useful garden plants.

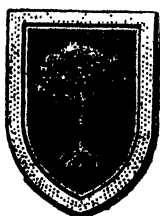
A. P. BALFOUR

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21 APR 1948

JOURNAL OF THE ROYAL HORTICULTURAL SOCIETY

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Part 3

March 1948

THE SECRETARY'S PAGE

Programme of Meetings—The following Meetings and Shows will take place during the months of March and April:—

- { Tuesday, March 2—12 noon to 6 P.M.
- { Wednesday, March 3—10 A.M. to 5 P.M.
- { Tuesday, March 16—12 noon to 6 P.M.
- { Wednesday, March 17—10 A.M. to 5 P.M.
- { Tuesday, April 6—12 noon to 6 P.M.
- { Wednesday, April 7—10 A.M. to 5 P.M.
- { Tuesday, April 13—12 noon to 6 P.M.
- { Wednesday, April 14—10 A.M. to 5 P.M. } Daffodils only
- { Tuesday, April 20—12 noon to 6 P.M.
- { Wednesday, April 21—10 A.M. to 5 P.M.

Daffodil Competition and Show—At the Show on April 6 and 7, there will be a Daffodil Competition, intended primarily for, but not restricted to, West Country growers. The Annual Daffodil Show will be held on April 13 and 14. Schedules may be obtained on application to the Secretary.

Rhododendron Competition—The Annual Rhododendron Competition will also be held in conjunction with the first Fortnightly Show in May. The schedule, containing numerous classes open to amateurs may be obtained from the Secretary.

Sewell Medal Competition for Alpines—A Sewell Medal for an exhibit of alpines staged by an amateur is offered for award at the first Fortnightly Show in April. Particulars are given in the schedule which may be obtained from the Secretary.

Lectures in March—On Tuesday, March 16, at 3 P.M., MR. PETER DAVIS will deliver a lecture on a "Journey in Western Anatolia", and on Tuesday, April 6, at 3 P.M., MR. N. F. LOCK, F.R.C.S., will speak on "Growing Daffodils in a Town Garden."

Demonstrations at Wisley—The following demonstrations will be given at Wisley, each one taking place between 2 P.M. and 4 P.M., that on the second day being merely a repetition of the demonstration given on the first:—

Vegetable Garden

Wednesday and Thursday, March 3 and 4—Outdoor Seed-bed Preparation and Seed Sowing.

Flower Garden

Wednesday and Thursday, March 10 and 11—Pruning of Roses and Shrubs.

Wednesday and Thursday, March 17 and 18—Seed Sowing and Vegetative Propagation of Alpines.

Fruit Garden

Wednesday and Thursday, March 24 and 25—Spring Spraying of Fruit Trees.

Gift of Lantern Slides—MRS. JOHN CARROLL PERKINS of Boston, Massachusetts, U.S.A., who has been for very many years a Fellow of the Society and who is well-known throughout the United States as a lecturer, especially on Gardens, has very kindly given the Society her collection of lantern slides of well-known and beautiful gardens in the British Isles. The collection consists of 465 slides and they will be formally presented to the Society on behalf of MRS. PERKINS by MR. T. S. ELIOT, O.M., on Tuesday, March 2, at 3 P.M. in the Lecture Room of the New Hall. After the presentation it is intended to show a selection from the slides. The Society is very grateful to MRS. PERKINS for this very valuable gift, which will commemorate her long residence in this country and close connexions with the Society.

White Fly Parasite at Wisley—Owing to increasing calls on glasshouse space at the Society's Gardens at Wisley, it will unfortunately not be possible, in future, to distribute white fly parasite to Fellows. Attempts are being made to find an alternative source of supply.

Surcharge on Postage—The Secretary wishes to tender his apologies to those Members of Committees who were surcharged by the Post Office for insufficient postage on the letters containing their committee tickets. A large batch of letters containing these tickets was taken to the Post Office on January 3 and the correct postage paid over the counter. Owing to an internal mistake in the Post Office these letters were only franked with a penny stamp instead of the twopence-halfpenny which had been paid.

A. J. Waley Medal—In 1937 MR. ALFRED J. WALEY presented a sum of money to the Rhododendron Association to provide a medal annually as an award to a professional gardener who has helped in the cultivation of Rhododendrons. Owing to the outbreak of the War this medal has never yet been presented and when the Rhododendron Association was incorporated in the Society the A. J. Waley Fund was handed over with the Association's other assets. The Council of the Society has awarded the medal for 1947 to MR. R. L. HARROW, V.M.H., for his work in connexion with Rhododendrons while Curator of the

Royal Botanic Garden, Edinburgh, and later when Director of the Society's Gardens, Wisley. MR. HARROW is thus the first recipient of this medal, which was presented at the Annual General Meeting.

Publications

The Rhododendron Year Book, 1947, will be available during this month. This contains an account of Rhododendrons at Bodnant by LORD ABERCONWAY as well as a number of other very important papers by DR. J. MACQUEEN COWAN, DR. J. HUTCHINSON, MR. F. KINGDON-WARD, MR. W. E. TH. INGWERSEN and others. The price is 8s. 6d., postage and packing 6d.

The Guide to Wisley Gardens is also available. This contains a full account of the gardens by MR. N. K. GOULD and is lavishly illustrated both in colour and in monochrome. It may be obtained from the Secretary, Vincent Square or at the Gardens. The price is 1s., postage and packing 3d.

The Botanical Magazine—It is regretted that owing to technical difficulties at the printers there has been considerable and unexpected delay over the publication of the first part of the New Series and the issue of the Prospectus. It has most unfortunately been found necessary to scrap the collotype plates and to start again using four-colour half-tone blocks. By this method the first part should be ready by the beginning of April and the Prospectus, the specimen plates of which will be printed from the same blocks, should be ready by the middle of March. It is hoped to publish the succeeding three parts of Vol. 165 on June 1, August 1 and November 15 respectively.

WISLEY IN MARCH

THIS month the number of flowers in the Gardens is greatly increased, particularly by the bulbous plants naturalized in the Wild Garden, Alpine Meadow and the Rock Garden, while the Alpine House is filled with a fine collection of Saxifragas, Primulas and the smaller bulbs suitable for growing in pans.

Round the Laboratory several Crocus species are in full flower, together with the yellow bells of *Chimonanthus praecox* (*fragrans*) var. *luteus* and the later form of *Iris unguicularis*.

In the Half-Hardy House the prostrate form of the Tasmanian *Acacia diffusa* will be covered with small heads of yellow flowers, while the same colour is also seen in the Italian *Primula Palinuri*. Two Paeony species, *P. Cambessedesii* and *P. Clusii* (*cretica*) also flower this month, the former having deep rose, and the latter white blossoms; both are hardy in the open at Wisley but the flowers are very liable to be spoilt by the weather.

The Temperate House contains many flowers in addition to those noted last month, while several of the stronger growing species such as *Tibouchina semidecandra* are breaking into new growth after their annual pruning. A fine specimen of *Rhododendron ciliicalyx* with pink

buds opening to paler fragrant flowers is very outstanding, while other Rhododendrons include the white *R. bullatum* and the later flowering fragrant *R. inaequale*. On the side benches *Ericas*, *Epacris*, *Primula kewensis* and many other plants continue in bloom.

Several outstanding shrubs are now in flower in the Award of Garden Merit Collection, including *Cornus mas*, the Cornelian Cherry, covered with a profusion of small yellow flowers followed by edible bright red fruits, and near the main path a larger specimen of the well-known *Prunus cerasifera atropurpurea* (var. *Pissardii*), probably the oldest tree in this collection, with pale pink blossoms and dark purple foliage.

In Seven Acres several Forsythias, including *F. Giraldiana* and the later flowering *F. suspensa* and *F. intermedia* var. *spectabilis*, are covered with yellow bells; while the Heath Garden has large drifts of *Erica carnea* in full flower, a large planting of the variety 'Springwood White' at the Eastern end being particularly outstanding. Other Heaths include the shrubby *Erica mediterranea* and the hybrid *E. darleyensis*.

Near the pond the first flowers will be opening on the many bushes of *Chaenomeles lagenaria* (*Cydonia japonica*) and *C. japonica* (*Cydonia Maulei*). The modern varieties of these shrubs are amongst the best substitutes for Rhododendrons and Azaleas in gardens where the lime content makes the growing of most Ericaceous subjects impossible; a further selection, including *Chaenomeles japonica* var. 'Knaphill Scarlet' and var. 'Moerloesii' ('Apple Blossom'), will be found in Howard's Field.

Entering the Wild Garden, where the last flowers still linger on *Hamamelis japonica* and the pale yellow variety *Zuccariniana*, we are greeted by the pink blooms of *Rhododendron arboreum* and the yellow of *R. lutescens*, while the ground is covered in many places with naturalized Scillas, Erythroniums and the marbled foliage of hardy Cyclamen. Near the southern boundary the colonies of *Narcissus cyclamineus* form one of the most striking features in the Gardens at this season. Amongst the shrubs in flower, the large specimens of *Pieris japonica* with hanging white bells are most impressive, while *P. floribunda* and the newer *P. taiwanensis* from Formosa, are also covered with buds which will expand during the latter part of the month.

The Alpine Meadow will be filled with the Hoop-Petticoat Daffodil, *Narcissus Bulbocodium*, intermixed with the previously mentioned *N. cyclamineus*, while the Rock Garden also contains many Snowdrops, Chionodoxas, and the bi-generic hybrid \times *Chionoscilla Allenii*, growing near the upper path. The blue of the early Lungwort, *Pulmonaria angustifolia*, and the pink and yellow of the Saxifragas, particularly *S. oppositifolia* and *S. apiculata*, will also be in evidence, with the hairy grey involucre and purple flowers of *Anemone Pulsatilla*.

The Alpine House contains several pans of early flowering Primulas in addition to the many Saxifragas mentioned in a previous note. They include *Primula marginata* with lavender flowers, rising above the farina-encrusted leaves, *P. Allionii* with mauve or white blossoms, the large Auricula-like leaves and yellow heads of *P. Palinuri*, and several interesting hybrids, particularly the Windrush variety of *P. Berninae* (*P. viscosa* \times *P. hirsuta*) which has handsome rose-pink flowers with a white eye. Bulbous plants also add greatly to the display. *Narcissus*

asturiensis, *N. Watieri* and *N. minor*, generally flower freely when grown in pans, while this treatment is also successful with the Chionodoxa-like *Puschkinia scilloides* with the variety *alba*. Fritillarias are not so accommodating as the bulbs divide after flowering and generally need several years' growth before the offsets are sufficiently large to produce flowering spikes, but *Fritillaria pudica* with yellow waxen bells and the white-flowered *F. bucharica* will be at their best during this month. In the frames and beds surrounding the Alpine House many Crocus species will be in flower, including the mauve *C. Tomasinianus*, which soon starts to colonise an area left undisturbed.

Pruning is now in progress on the long Rose borders and visitors will be able to note the different treatments accorded to the several types of Roses planted here, while the planting of the new beds has now been completed. Preparation of the annual border for seed-sowing will also be undertaken towards the end of the month.

On Battleston Hill the early Rhododendrons will already be in flower, including many of the *Lapponicum* and *Saluenense* series and others of similar dwarf habit with innumerable blossoms of pink, lavender, or violet, and an occasional yellow-flowered species, such as *R. chryseum* to provide a contrast. Perhaps more striking are the pale pink or rose flowers of the *Fortunei* series, *R. Fargesii*, *R. sutchuenense*, *R. calophytum* and *R. planetum*, but all are liable at Wisley to be spoilt by a single sharp frost. Camellias are also widely planted here and the dell contains a fine plant of *C. cuspidata* carrying a great number of buds; many varieties of *C. japonica* are also well established and several new plantings have also been completed.

The new path encircling the hill has been continued and many Rhododendron hybrids which have received a F.C.C. or A.M. from the Rhododendron Committee have been grouped together in the borders near the new bridge. The path is being extended and when complete will provide a most delightful route to the new Cherry planting on the Portsmouth Road Field.

ANEMONE HORTENSIS AND A. PAVONINA

A HISTORY OF CONFUSION

E. A. Bowles, F.L.S., V.M.H.

THE divergent views of botanists regarding the status of two plants have seldom produced so much confusion as occurs in the varying usage of specific and varietal names for *Anemone hortensis* L. (*A. stellata* Lam.) and *A. pavonina* L. The confusion resembles that of a tangled skein in which the two ends have become untraceable. If either end could be found and used as a starting point, disentanglement would be easy; otherwise pulling at intermediate portions can only aggravate the task. In this plant puzzle one of the obscured ends is represented by the early lack of knowledge of the separate geographical

distribution of the two plants and the other clue can be found in the difference in form and number and, to some extent, the colour of their tepals. In the light of present knowledge, two main groups may be distinguished. One, to which *A. pavonina* belongs, inhabits Greece, Macedonia and Asia Minor (Troad) and has seven to twelve rather broad elliptic tepals, frequently scarlet, sometimes pink or purple. The other, to which the name *A. hortensis* is now restricted, inhabits France, Italy, Dalmatia and Albania, and has twelve to fifteen or more rather narrow lilac or rosy-lilac narrowly elliptic tepals, so that the flower justifies LAMARCK's choice of the epithet *stellata*. There are also hybrids between the two groups occurring in a more or less wild state, which have helped to obscure these distinctions. These Anemones are among the most brilliant and beautiful of spring-flowering plants and have been cherished in gardens for over three and a half centuries; a study of their history has thus a horticultural as well as a botanical interest.

THEOPHRASTUS (370 B.C.—c. 285 B.C.), who was born in Lesbos but passed most of his life at Athens, knew and correctly distinguished the Anemones native to Greece under three names:—ἀνεμώνη (*anemone*) which flowers in winter, i.e. *A. coronaria*; ἀνεμώνη ἢ ὄρεα (*anemone oreia*), the mountain Anemone, i.e. *A. blanda*; ἀνεμώνη ἡ λειμωνία (*anemone leimonia*), the meadow Anemone, which flowers later, i.e. *A. pavonina* (cf. THEOPHRASTUS, *Enquiry*, transl. HORT).

The origin of the confusion can be traced back to the middle of the first century of the Christian Era when the contemporary authors PLINY and DIOSCORIDES divided Anemones into two groups based on the artificial characters of either growing wild or under cultivation. PLINY's wording is "Duo cujus genera, silvestris prima, altera in cultis nascens" (rendered by HOLLAND as "two principal kinds there be of it: the first groweth wild . . .; the second commeth in places well tilled and in gardens"). DIOSCORIDES wrote Ἀνεμώνη δισση, ἡ μὲν ἀγρία, ἡ δὲ ἡμερος (translated by GOODYER as "Anemone is two-fold, one wilde, the other sative").

The similarity of these statements indicates that both were derived from an earlier source. In SPRENGEL's Latin version of DIOSCORIDES' *Materia medica*, the Greek ἡμερος (*hemeros*) is rendered *sativa* (i.e. sown or planted), but MATTIOLI in the Venice edition of 1565 used PLINY's words *in cultis nascens*.

This phrase became the source of confusion because CLUSIUS (1526–1609) in his *Rariorum Plantarum Historia* (1601) based his arrangement of Anemones on the simple but misleading dual divisions used by the ancient authors; as he himself stated: "DIOSCORIDES and PLINY made two classes of Anemone: one, wild; the other born in cultivation." In his Chapter 56 he dealt with those he considered wild (*silvestres*) and in the two next chapters with those which he regarded as agreeing with PLINY's second group and as being produced under cultivation, quoting his words *in cultis nascens*. In Chapter 57 CLUSIUS used the word *cicur* (tame*) for this group at first, but when dealing

* Compare Lyte's translation of *Dodoens* (1573), "the one is tame and the other wilde."

with the kinds separately, he substituted *hortensis* (pertaining to gardens) as the first epithet attached to each.

CLUSIUS and other early authors knew many east Mediterranean plants solely by those forms then grown in gardens. These were chiefly obtained from Constantinople and included single- and double-flowered varieties of *Ranunculus asiaticus*, *Anemone coronaria* and *A. pavonina*, all three with a wide range of colours, besides Tulips, Hyacinths, *Narcissus Tazetta* (then known as *N. Byzantinus*) and others showing characters which suggested a garden origin. CLUSIUS seems to have been so strongly impressed by their beauty and value as cultivated plants that in most cases he neglected tracing their origin to a wild type and was content with recording the garden forms of which he received specimens.

CLUSIUS described eighteen kinds in his *Historia* Chapter 57 (1601) under the heading *Anemone hortensis latifolia simplici flore*, and those numbered v to xviii, on pp. 250-253 inclusive, can be recognized as varieties of *A. pavonina* Lam. which are widely distributed as native plants in Greece. The last three (nos. xvi-xviii) belong to the *A. pavonina* α *typica*, *sensu lato*, of HALÁCSY's *Conspectus* I. 5 (1900), with scarlet flowers; the others are pink or purple forms of the variety β *purpureo-violacea* (Boissier) Halácsy, all of which CLUSIUS knew only as garden plants. Unfortunately and inconsistently he included under *hortensis* in this chapter (as Nos. i and ii) the single and double forms of *A. palmata* L. and (as Nos. iii and iv) forms of *A. hortensis* L. (*A. stellata* Lam.). He stated that he had observed these growing among briars, the former in Portugal, near the Tagus, and the latter in Germany, near the Rhine between Mainz and Andernach. If they had been placed in the *Anemone silvestris* chapter the confusion of *A. hortensis* (*A. stellata*) with *A. pavonina* might have been prevented. By placing the western plant (*A. hortensis*) and the eastern *A. pavonina* Lam. as the third and fourth of his series headed *Anemone hortensis*, CLUSIUS obscured the clues of their distinct geographical distribution.

Although CASPAR BAUHIN (1560-1624) in the *Pinax* (1623) did not adopt CLUSIUS's term *hortensis* in his own numbered series of headings he mostly cited the headings used in CLUSIUS's *Historia* as his first references. For example, in BAUHIN's *Pinax*, 173, under the heading II *Anemone Geranei rotundo folio purpurascens* occurs the citation "*Anemone latifol. altera* Clus. hisp. *Anemone hort. latifol. simp. flore* 3. eid. hist."

So LINNAEUS (1707-78) when compiling his *Species Plantarum* found a long series, in CLUSIUS's *Historia* and also in BAUHIN's *Pinax*, with *hortensis* used as the first epithet. LINNAEUS wisely rejected the unsuitable epithet *hortensis* for CLUSIUS's No. i and used *palmata* instead; but unwisely chose it for the specific name of CLUSIUS's No. iii (Fig. 18). which is one of the least amenable to cultivation of the *latifolia* group.

It is indeed a pity that this plant so rarely seen growing in gardens should be branded for all time with such a false and misleading name. When we remember that LINNAEUS knew of many localities in Italy where it grew wild as well as the one near the Rhine, it is not easy to ascertain from the references he cited in the first edition of *Species Plantarum* that he had a reason other than CLUSIUS's use of *hortensis* for regarding it as a garden plant. It is only by referring to his earlier

work dated 1737, the *Hortus Cliffortianus*, that we find the first hint of his confusing the small lilac flower he then called *Pulsatilla foliis digitatis* with monstrous double-flowered forms of *A. pavonina*. In a note on p. 224 he stated, "Variat florum plenitudine et colore." By itself this does not provide sufficiently conclusive evidence, for it might be pleaded he meant no more by "plenitudine" than to include the "*Anemone latif. purpurascens rubescens plena* Eyst: desc.", cited by BAUHIN *Pinax*, 176 under No. xi, which BAUHIN described as differing from CLUSIUS's No. iii in the great number of floral leaves. Also as regards colour LINNAEUS described the extent of variation in terms which imply a tendency towards redness but not scarlet or crimson. He wrote "rubedine purpurea" and "dilutiore purpurea rubet" which mean nothing deeper than rosy purple or a blush of pink on paler lilac.

BAUHIN's description agrees well with the plant LAMARCK renamed *A. stellata* (1783), and so far as the first edition of *Species Plantarum* (1753) counts, there is no obligation to make it include *A. pavonina*.

The second edition (1762), however, provides absolutely incriminating evidence that, whatever he may have had in mind when he wrote the *Hortus Cliffortianus* (1737), LINNAEUS included both plants under *A. hortensis* in 1762. In order to do this a second citation from BAUHIN's *Pinax* was added, namely "*Anemone hortensis latifolia* Bauh. pin. 176."

BAUHIN's page contains under the heading *Anemone flore pleno*, six varieties of the double-flowered *A. pavonina*, five from CLUSIUS, one from BRY, which were imported from Constantinople and were very popular in gardens during the sixteenth and early seventeenth centuries—under such names as *A. latifolia*, *maxima versicolor*, *polyanthos Chalcedonica*, *Pavo major* and other fine titles. LINNAEUS seems to have been misled by the narrowness of the tepals of these monstrous double forms into mistaking them for garden varieties of the only other *latifolia* Anemone that he knew, in which the tepals are long and narrow, and therefore he connected them with the No. iii (i.e. the western *A. hortensis* L.) of CLUSIUS instead of No. xvi (i.e. the eastern *A. pavonina ocellata*).

Apparently LINNAEUS knew little or nothing of living specimens of *A. pavonina*. It is represented in his herbarium by only one specimen (710/13) and that is the double monstrosity, and he may not have seen any of the single forms. Possibly he relied too much on BAUHIN's citations from CLUSIUS and did not study the *Historia* for himself and so overlooked the wonderfully accurate descriptions of the fourteen varieties (Nos. v–xviii) there called *A. hortensis latifolia simpliciflore*. CLUSIUS came very close to the solution of the problem of what is the wild type from which the double scarlet *pavonina* has been derived. Though he never stated or even hinted that he regarded his No. xvi (Fig. 17) in that light, his description leaves no doubt that it represents the *A. pavonina* var. *ocellata*, still plentiful in Greece and naturalized in the South of France. Here in semi-cultivated ground it varies even when propagated vegetatively, producing forms like the wild type having eight wide tepals with yellow claws, through every phase of doubling, to the monstrosity with a hundred or more narrow tepals, each of them showing traces of the yellow base. CLUSIUS described

the eight tepals of his No. xvi as more or less equalling in length those of the Anemone named 'Pavo major' (great Peacock), and being of the same most elegant scarlet colour, "hoc est, elegantissimo coccineo interna parte nitens" with the claws paler. The block used on p. 253 plainly shows the pale base of the eight claws forming a clearly edged circle. The adjacent figure of No. xvii (i.e. *A. pavonina typica*) shows a flower without any pale basal circle and is described as having eight tepals of most elegant glowing scarlet (coccineus) with no differently coloured base. These figures and descriptions aptly fit the two principal wild forms of *A. pavonina* found in Greece which were only known to the early authors through tubers sent from Constantinople. If these two and CLUSIUS's No. iii had been placed in his *silvestris* chapter without the epithet *hortensis* there need have been no confusion.

The *Hortus Floridus* of CRISPIAN DE PASSE THE YOUNGER (c. 1589–1667) contains some of the most beautiful of copper-plate engravings of flowers. Plates 15, 16 and 17, seven exquisite figures, are accurate portraits of varieties of *A. pavonina*. Fig. 3 on plate 15 represents the purely scarlet No. xvii of CLUSIUS (i.e. *A. pavonina typica*) and is described as "pulcre rubenti flavoque colore (quem Belgae Oregium vocunt)." Plate 16 gives as perfect a drawing as one can desire of CLUSIUS's No. vi (i.e. *A. pavonina ocellata*) with the golden basal ring, this being called *A. pavo flore simplici* by DE PASSE. Thus very soon after CLUSIUS's *Historia* appeared, DE PASSE recognised the single flowered form correctly. The next figure called *Anemone pavo major* is semi-double with twenty to thirty tepals, and corresponds to CLUSIUS's *Pavo major*. It shows the yellow basal ring and a centre of normal carpels and stamens, and represents the first and still orderly slip towards the huge monstrosity with hundreds of narrow confusedly twisted tepals that was so highly prized and called *A. latifolia Chalcedonica maxima polyanthos*. In this state the stamens and carpels are all transformed into petaloid bodies, and when many tepals were striped with white or green, the further name of *versicolor* was bestowed on them. It is likely that LINNAEUS never saw DE PASSE's excellent series depicting the stages from the wild type to the double monstrosity with variegated colours. Had he seen them he would surely have realised that the fairly wide tepals of *Pavo major* were not enlargements of those of his *hortensis* before further development brought about their reduction again to the narrow form.

From the time of LINNAEUS' *Species Plantarum* no author questioned the supposed derivation of *Pavo major* from CLUSIUS' *latifolia* No. iii (= *A. hortensis* L.) until LAMARCK (1744–1829) described the two plants as separate species in the *Encyclopédie Méthodique, Botanique*, 1. 166 (1783). He named the scarlet one *A. pavonina** and cited *A. latifolia Pavo major dicta*, Nos. iv–vi of BAUHIN's *Pinax*, adding that, although he had only seen it cultivated, and with double flowers, he believed it a native of the Levant and that the wild type would probably not differ

* This should not be confused with the white-flowered and in no way peacock-like *A. Pavoniana* of Spain which commemorates the Spanish botanist JOSÉ PAVON. LAMARCK's epithet *pavonina* ('like a peacock') was obviously suggested by the old garden names *Pavo major* and 'œil de Paon' ('peacock-eye') for the double scarlet Anemone.

greatly from *A. coronaria*. This implies that LAMARCK believed there must be a single form which was not the *A. hortensis* L. (i.e. CLUSIUS's *A. hort. latifolia*, No. iii); he evidently also overlooked the figures of the single scarlet form in the works of CLUSIUS (No. xvi) and DE PASSE (plate 16), [reproduced in Fig. 14].

At the same time LAMARCK, in order to obtain a clear distinction between them, proposed *A. stellata* as a name for the western European plant with fifteen narrow lilac tepals. This name is not valid, as it applies to the plant which LINNAEUS had earlier named *A. hortensis*. *A. pavonina* Lam., on the contrary, though based upon a double form of unknown origin, is the correct name for the scarlet species with eight wide tepals native to Greece.

LAMARCK's name *pavonina* was taken up by botanists but in varying combinations and for many years always with reference to the double form. The hybrid plant named *A. fulgens* J. Gay and found near Dax was for a time incorrectly regarded as the single form of LAMARCK's *pavonina*. The true single form remained unnoticed until 1826 when RISSO (1777-1845) mentioned it without description, under the name *A. regina*, as growing near Nice. RISSO's description of his *A. regina* did not appear until 1844. He describes the flower as "medium-sized, with nine oval pointed blood-red tepals ornamented at base with a yellowish aureole." By considering this single form with golden claw a distinct species, RISSO failed to connect it with its double form, LAMARCK's *A. pavonina*, although he was well acquainted with both plants. The credit for placing *A. regina* under *A. pavonina* as a variety must be given to GÜRKE who in 1903 published the combination *A. pavonina* var. *regina*, although the correct name is *A. pavonina* var. *ocellata*.

Further confusion was caused by the discovery in the Landes district, south-western France, of the plant known as *A. fulgens* J. Gay, which some French botanists imagined to be the single form of *A. pavonina* Lam. In 1803 JEAN THORE (1762-1823), a physician living at Dax, published an account of the plants of the district (*Essai d'une Chloris du Département des Landes*) and mentioned on p. 238, under the name *A. hortensis*, a bright red-flowered Anemone ("d'un rouge très-vif") very common in the vineyards of the chateau of St. Pandelon near Dax and around St. Sever.

THORE and his friend GRATELOUP (d. 1861) sent specimens of this to LOISELEUR-DESLONGCHAMPS (1774-1849), who described them in his *Flore française* in 1810 as "*A. pavonina* Lam." but gave the number of tepals as ten to fifteen. In 1828 LOISELEUR published an excellent figure by POITEAU in his never completed *Flore générale de France*, t. 79. He was the first to associate THORE's *hortensis* with LAMARCK's *pavonina* as though the Dax specimens represented the single-flowered wild form of the double 'Œil de paon' of gardens.

In 1820 GRATELOUP published *Description de l'Anemone Œil de Paon* (*A. pavonina* Lam.) and wrote that it was still confused by some botanists with *A. hortensis*; he described the perianth as large, bright blood-red, with an astonishingly large numbers of long tepals. He distinguished three varieties:—(1) with ten to fifteen oblong obtuse tepals, in vineyards of St. Pandelon, Habas, Narosse, Mugren, which is

A. fulgens J. Gay; (2) with tepals long, narrowed and pointed, much multiplied, easily becoming double in cultivation, which is well figured by BESLER, *Hort. Eyst.* 17, f. 2, and might be the garden form variegated with white which LAMARCK described as *A. pavonina*; (3) with narrow pointed tepals but much smaller than in the preceding varieties, not red but violet and at first sight differing little from *A. hortensis*, discovered near Mont-de-Marsan by LÉON DUFOUR RENAUD. This seems to be JORDAN's *lepida*.

Specimen of *A. fulgens* from J. GAY's herbarium now at Kew was gathered by GRATELOUP in 1817 near Dax. The sheet bears a note written by GAY on the synonymy which shows clearly that he did not regard *fulgens* as the single form of *pavonina* Lam. He attributed the publication of the name "*fulgens* N." to "*Rchb. Icon. Bot. Cent.* 3a (1825), plate 1, tab. 201." and cited as synonyms *A. hortensis* Thore, *Chlor. Land.* 238, *A. pavonina* Loiseleur, Notice 87, "non Lam. nec Decand," and *A. pavonina* β *fulgens* of DE CANDOLLE, *Prod.* 1. 18. One of the specimens is semi-double and, as MOGGRIDGE stated, "the double variety [of *A. fulgens*] differs from ours [i.e. *A. pavonina ocellata*] in colour, size of leaves, and in the extreme narrowness of the sepals which are sometimes almost filiform." MOGGRIDGE does not refer to the absence of the pale yellowish colour of the claws, but all the specimens that have come within my notice lack this pale claw.

It is clear that JACQUES GAY, who was an acute and accurate botanist, did not agree with his predecessors in regarding the bright red Dax Anemone as conspecific with either *A. hortensis* or *A. pavonina*; he accordingly named it *A. fulgens* and, although he himself published no description, evidently communicated herbarium material under this name to DE CANDOLLE and to REICHENBACH. DE CANDOLLE treated it with some hesitation as a var. β . *fulgens* of *A. pavonina* in his *Prodromus* 1. 18 (January 1824), citing "*A. fulgens* Gay. ined. *A. hortensis* Thor. chl. land. 238. *A. pavonina* Lois. not. 87" as synonyms and recording it solely from "vineis Vasconiae circa Dax." The name "*A. fulgens* Gay! ined." was validly published next year by REICHENBACH in his *Iconographia Bot.* 3. 1, t. 201, f. 343 (1825), who regarded it as a species. Later in his *Icones Florae Germanicae* 4. t. 49, f. 4650 (1840). REICHENBACH published a figure of the plant as *A. pavonina*, referring back to his *Flora Germanica Excursoria*, No. 4650 (1830-32), where *A. fulgens* is stated to be perhaps the mother ("forte mater") of *A. pavonina*.

Of REICHENBACH's *Icon. Fl. Germ.* No. 4650 (1840) DR. GINA LUZZATO writes that it is "a figure which much resembles that published by him in 1825, under the name of *A. fulgens* GAY; the dimensions of the flower are a little smaller but the sepals are still wide and not acute, fifteen in number; the figure does not correspond with the intention of the author, because in *Flora Germanica Excursoria* of 1830-32, under the same number 4650, *Anemone pavonina* Lam., he said, "petalis 10-12 lanceolatis acutissimis." The monographer of *Anemone*, G. A. PRITZEL, adopted REICHENBACH's view that *A. fulgens* might be the "mother" of *A. pavonina*, and in his *Anemonarum Revisio* (*Linnaea* 15. 618: 1842), invented a new classification using *A. fulgens*

J. Gay, as the specific name for a group which included as synonyms "*A. hortensis*" Thore, "*A. pavonina*" Lois., *A. pavonina* β *fulgens* DC., *A. latifolia* Bellardi, and both of REICHENBACH's figures. He created a var. β *sepalis numerosis angustioribus, acutissimis* for *A. pavonina* Lam.

A fresh complication arose about 1840 when French and Italian botanists observed the single form of *A. pavonina* growing among the double one near Nice and began to include it under various names in local floras: RISSO as *A. regina*; MOGGRIDGE in 1864 in Ed. I of his *Fl. Mentone*, and in Ed. II (1867) as *A. hortensis fulgens*, which he altered in the third edition of 1874 to *A. hortensis ocellata*.

In 1847 in their *Flore de France*, I. 14, which long remained the standard work on French plants, GRENIER and GODRON defined *Anemone hortensis* in a broad sense, treating the Linnean *A. hortensis* as a var. α *stellata*, GAY's *A. fulgens* as β *fulgens* and LAMARCK's *A. pavonina* as γ *pavonina*. RISSO's *A. regina* is not cited but would appear to have been included in their β *fulgens* recorded from "Grasse, Toulon; Nîmes; Montpellier; Corse a Calvi." This classification failed to gain universal approval. HENRI LORET, for example, in *Bull. Soc. Bot. France*, 6. 33 (1859), knowing both *pavonina* and *stellata* in Provence and Italy and finding them always readily distinguishable, declared that they were two distinct species, which he called *A. stellata* and *A. fulgens*. It is evident that under *A. fulgens* he included not only the true *A. fulgens* J. Gay of Landes but also *A. regina* Risso of the Riviera, and as the name *A. pavonina* Lam. was based on a monstrous double form he called this *A. fulgens* var. *duplex*. BOISSIER (1810-85) in 1867 (*Fl. Or.* I. 12) took much the same view of *A. fulgens*, applying this name to the red *Anemone* with seven to nine tepals found in Greece (in Messenia, Argolis and Attica), noting that this differed from the French plant figured by REICHENBACH, *Icones* No. 4650 (i.e. the true *A. fulgens* Gay) in having fewer and broader tepals. At the same time BOISSIER described an *A. fulgens* β *purpureo-violacea* found in Attica, Messenia, on Chios and at Constantinople, which reminded him of *A. stellata* in flower-colour.

In 1883 the ABBÉ ALEXANDRE PONS (b. 1853) published a paper in *Bull. Soc. Bot. France*, 30. lxxv-lxxxvii (1883) giving the results of a series of careful observations and experiments carried out by the ABBÉ E. GOATY (b. 1830), and himself with the native *A. hortensis* (*stellata* Lam.) and the introduced *pavonina* so widely naturalized around Nice and Grasse as well as the hybrids *variata*, *lepida* and *purpurata*. PONS found all of these growing together at Mouans (near Grasse) and searched for pure colonies; he found *stellata* by itself in rough grass, evidently in a wild state, and there unmixed with *pavonina* it never varied to red. He also found the red *pavonina* forms unmixed with *stellata* always in cultivated ground but never found a place where only one of what he called the two forms (i.e. single or double) grew unmixed. He confused the names, calling the single form *fulgens* Gay or *regina* Risso and for the double form he used *pavonina* DC. He concluded by declaring that "Pour nous, les *Anemone fulgens* Gay, *hortensis* Thore, *Regina* Risso, *pavonina* DC., sont des formes différentes d'une seule et même

plante." Thus he rightly connected *pavonina* Lam. and *regina* Risso as forms of one plant.

PONS proved this beyond question by thrice selecting the large single forms with wide tepals and yellow basal ring and cultivating them by vegetative propagation; he found that in the fifth year in each case they produced the three principal forms, namely, single, semi-double with narrower tepals and the fully double lacking anthers and carpels. In the following year he had none but fully double forms. One year he obtained two different forms of flower on the same rootstock (même griffe). Soon after PONS had proved by observation and experiments that the single form of *pavonina* Lam. foreshadowed by LAMARCK could be found in France and when watched in cultivation produced the double one, it took its place in the taxonomy of later writers but with such varying arrangements that it would be tedious to enumerate.

It is a relief to turn to a flora of Greece, the native country of *A. pavonina*. In his *Conspectus Florae Graecae*, I. 5 (1900), HALÁCSY (1842-1913) described it from personal knowledge. Under *pavonina* Lam. he arranged two colour forms, α *typica* with scarlet flowers, and β *purpureo-violacea* (Boiss.) with lilac or rose flowers, but did not refer separately to the *regina* of RISSO and *ocellata* of MOGGRIDGE, although this form with the golden-ringed base commonly occurs in Greece. The amount of yellow marking on the base of the tepals varies from small spots to entirely golden claws forming a complete central ring. Around Athens the entirely scarlet form is the more plentiful.

HALÁCSY noted that var. β *purpureo-violacea* seems to pass into a form intermediate between this and *A. hortensis* L. from which it differs in its larger flowers with fewer and broader tepals. HALÁCSY recorded *A. hortensis* L., with *stellata* Lam. as a synonym, from Greece, occurring, however, less frequently than *A. pavonina*, chiefly in the western regions in several islands. DR. GINA LUZZATO in her second paper on this group, published in *Archivio Botanico*, 10 (1934), after an almost exhaustive examination of specimens in many herbaria, concludes that *A. stellata* Lam. does not occur in Attica, as she found all specimens so labelled were *A. pavonina* and for the most part the var. *purpureo-violacea*. HALÁCSY stated it was most plentiful in Corfu (Corcyra) but LUZZATO only saw specimens of rose or lilac forms of *purpureo-violacea* from that island, though some have a greater number of narrow tepals like the var. *parviflora* from Macedonia. Likewise she recognised specimens labelled *hortensis* L. from Patras, Cephalonia and the Cyclades as really *A. pavonina* Lam. var. *purpureo-violacea*. She also excluded *stellata* from the Bulgarian flora.

ULBRICH'S work on the genus in ENGLER, *Bot. Jahrb.* 37. 248 (1905) contains a list of localities for *A. hortensis* L. in Greece and the western islands. LUZZATO stated that ULBRICH'S localities for Greece were based on eight sheets in the Berlin Herbarium labelled *A. hortensis* L. and mostly from Attica; two were *A. pavonina* α *typica* and the other six β *purpureo-violacea*.

SIBTHORP (1758-1796) and SMITH (1759-1828) included a beautiful plate of *A. hortensis* L. (*A. stellata* Lam.) in their *Flora Graeca*, 6. t. 515 (1827), and described it as found "in collibus Graeciae." It should be

remembered, however, that this magnificent work includes not only species native to Greece but also others found by SIBTHORP in Italy and elsewhere. He died prematurely and SMITH, who never visited Greece, had to do the best he could with SIBTHORP's scanty notes and BAUER's coloured drawings. As his executor HAWKINS wrote, in 1800, "it is certainly a pity that DR. SIBTHORP did not mark all his specimens or the drawings: but he trusted to his memory, and dreamed not of dying." Hence this plate is no proof of the occurrence of *A. hortensis* in Greece.

So far as the herbarium material examined by LUZZATTO shows the eastern limit of *A. hortensis* L. (*A. stellata* Lam.) extends no farther than Dalmatia. All specimens attributed to *A. hortensis* L. from more eastern localities she recognised as *A. pavonina* Lam. var. *purpureo-violacea* (Boiss.) Halácsy or its smaller form which she calls *f. parviflora* (Heldr.) Luzzatto. This smaller form has the involucre closer to the flower and also a greater number of narrower tepals; it replaces the eight-tepalled *purpureo-violacea* of Attica in Macedonia, Salonica and Zante, and has been described as "*ad stellatam vergens*."

These northern forms certainly resemble *A. pavonina* more closely than they do *A. hortensis* in their range of colour which may be red, rose-pink, pale salmon-pink as well as many shades of violet and reddish-purple, and most of them have the whitish central zone so characteristic of var. *purpureo-violacea*. According to LUZZATTO, some of the specimens from Corfu resemble them in having eleven to thirteen pointed tepals. LUZZATTO thought that no such forms occurred in Attica among those with normally eight tepals, but in 1926 I gathered some specimens on Hymettus which had numerous narrow tepals and one was entirely double, showing no trace of stamens or carpels.

The tendency towards a greater number of tepals than eight need not suggest any influence of crossing with *A. stellata* Lam. as there is no evidence that the two species meet in their natural area, and the increase in tepals which occurs so freely with *A. pavonina* Lam. in cultivation occurs also in other species, e.g. *A. palmata*, *A. blanda*, *A. apennina*, *A. nemorosa*, *A. ranunculoides*, *A. coronaria*, *A. sylvestris* and *A. hupehensis*.

There is yet another source of confusion which has been used as an argument against the separation as species of *A. hortensis* L. (*stellata* Lam.) and *A. pavonina* Lam. Where *A. pavonina* has become naturalized near wild colonies of *A. stellata* or both are grown in a garden, very variable races of fertile hybrids occur freely; these range from forms but little larger than the wild parent *A. hortensis* (*stellata*) to others almost as large as *A. pavonina* with more numerous tepals and with or without a pale central band. Such are particularly plentiful in the neighbourhood of Grasse, and near Nice. The *A. stellata* β *purpurata*, figured in SWEET, *British Flower Garden*, 2. t. 112 (1825), and many coloured forms listed by nurserymen as varieties of *A. stellata* are examples of these hybrids, as are also the *A. versicolor*, *A. lepida* and *A. variata* of JORDAN; I believe that *A. fulgens* J. Gay was produced from the same parental species and is a clone selected for the sake of its brilliant colouring.

It may help to make matters clear if we review the facts under the simile of two tangled skeins. This implies four distinct ends, each end representing a clue which if found and followed along carefully should lead to the other end and the separation of both skeins. One skein stands for *A. hortensis*, the other for *A. pavonina*. The clues, or free ends, of both skeins are represented by end A (distinct area of distribution) and end B (colour, form and number of the tepals). In skein No. 1, *A. hortensis* L. (*stellata* Lam.), end A is a south-western European distribution from France to Dalmatia and Albania, and end B is the starry flower of fifteen or so narrow lilac or rosy-lilac tepals with no white claws and ash or slate-coloured reverse. In skein No. 2, *A. pavonina* Lam., end A is a south-eastern European distribution from Corfu to Thrace and north-west Asia Minor, end B is the flower of eight or so broad, ovate, scarlet, salmon-pink, lilac or red-purple tepals frequently with yellow or white claws.

PLINY and DIOSCORIDES recognised only two classes of Anemones, wild and cultivated, giving great attention chiefly to the latter and so little to natural geographical distribution that the A ends were hidden away.

CLUSIUS elaborated the distinction from the cultivator's view and included as garden plants some he knew to be wild along with those purchased from merchants in Constantinople. He placed the Grecian *A. pavonina* alongside the western *A. stellata*, in the section he called *hortensis*. The two skeins remained entangled, although CLUSIUS described and figured accurately several wild forms of *A. pavonina* and came very near separating them according to their B ends.

CRISPIAN DE PASSE only figured the more beautiful garden plants and therefore did not include *A. stellata*, otherwise the exquisite figures of *pavo major* in its single, semi-double and fully double form must have convinced later writers that the great double scarlet *chalconica* was not derived from *A. stellata*.

LINNAEUS may not have seen DE PASSE's figures of *pavo* and ignored CLUSIUS's descriptions and figures; being misled by the narrow tepals of double *pavonina* he regarded this as derived from *stellata* and in the second edition of *Species Plantarum* cited a second reference from BAUHIN's *Pinax* which refers to double forms.

So we may say that LINNAEUS tied the B ends of the two skeins together to form one species under the name *A. hortensis*.

LAMARCK saw that this was a mistake and untied LINNAEUS's knot and separated the lilac *A. stellata* Lam. from scarlet *A. pavonina*. As he knew the latter only in its double garden form he did not trace skein 2 to its A end, and the single *pavonina* remained a mystery.

THORE later discovered the scarlet starry Anemone of the vineyards near Dax and believed it to be the single *pavonina*, but JACQUES GAY regarded it as a separate species (*A. fulgens*). Had THORE been right the A or B ends of skein 2 were found, and if GAY was right his view amounted to cutting a portion off skein 2.

PRITZEL and MOGGRIDGE (in his first edition) held this view, but other authors tied the piece on again, regarding *fulgens* as simply a variety of *A. pavonina*.

RISSO then cut off a piece for the yellow-ringed variety, which he named *regina* as a species. ROUY and FOUCAUD tied it on again as variety *regina*. MOGGRIDGE in his last edition tied his portion back again as his variety *ocellata* unaware that RISSO had previously named it *regina*.

BOISSIER severed a strand of skein 2 for his *A. fulgens* β *purpureo-violacea* with lilac flowers. HALÁCSY tied it back as variety of *A. pavonina* Lam. making the scarlet Greek plant var. α *typica*. DR. LUZZATO after careful examination of a vast number of herbarium specimens concluded (1) that *A. stellata* Lam. does not occur eastward of Dalmatia, (2) from Corfu to Thrace specimens labelled *A. hortensis* L. are *A. pavonina* Lam. var. *purpureo-violacea* (Bois.) Halácsy, (3) that the scarlet plant naturalized in Provence is var. *ocellata*, and (4) the Gascony plant *A. fulgens* is not a form of it. Thanks to her patient and careful work, the two skeins have now been satisfactorily separated.

Some confusion still remains as to the status of JORDAN's *A. lepida* and *A. variata* and GAY's *A. fulgens*. Most likely they are all hybrids which arise whenever naturalized or cultivated forms of *A. pavonina* occur alongside *A. stellata* and they could be represented as portions cut off skeins 1 and 2 and twisted together.

BIBLIOGRAPHICAL SUMMARY

W. T. Stearn

The elaborate synonymy of *Anemone hortensis* and *A. pavonina*, whose involved history is discussed above, may be set out as follows:

I. ANEMONE HORTENSIS Linnaeus

Anemone hortensis latifolia simplici flore iii Clusius, Rar. Pl. Hist. 249, with figure (1601).

A. Geranei rotundo folio purpurascens C. Bauhin, Pinax, 173 (1623).

Pulsatilla foliis digitatis Linnaeus, Hortus Cliffort. 224 (1737).

Anemone hortensis Linnaeus, Sp. Pl. I. 540 (1753); Sibthorp and Smith, Fl. Graeca, 6. t. 515 (1827); Coste, Fl. France, I. 41 (1901); Bonnier, Fl. Compl. France, I. 16, t. 6, fig. 19 (1911).

A. stellata Lamarck, Encycl. Méth. Bot. I. 166 (1738); Moggridge, Fl. Mentone, t. 2 (1871).

A. versicolor Salisbury, Prod. Hort. Chapel-Allerton, 371 (1796); non Jordan (1852).

A. hortensis var. β *obtusiflora* Spach, Hist. Veg. 7. 251 (1839).

A. hortensis var. α *stellata* (Lam.) Grenier and Godron, Fl. France, I. 14 (1847).

A. stellata var. *parviflora* Pons in Bull. Soc. Bot. France, 30. lxxx (1883).

A. hortensis subsp. *stellata* var. *parviflora* Burnat, Fl. Alpes Marit. I. 13 (1892).

A. hortensis var. *typica* Gürke in Richter, Pl. Europ. 2. 469 (1903).

Tepals 12 to 15, narrowly elliptic, lilac or rosy lilac without a pale claw. Native of southern France, Italy, Dalmatia and Albania.

II. A. PAVONINA Lamarck

The type of *A. pavonina* is the monstrous double form listed below as var. *pavonina*. The others are the single-flowered colour-forms with

7-12, elliptic, rather broad, scarlet pink or purple tepals. The species is native to Greece, Macedonia and western Asia Minor.

(a) A. PAVONINA var. TYPICA Halácsy

Anemone hortensis latifolia simpliciflore xviii Clusius, Rar. Pl. Hist. 259 (1601).

A. pavonina var. α *typica* Halácsy, Consp. Fl. Graecae, 1. 5 (1900).

As Halácsy describes the flowers of his *typica* as being simply "coccineis" without reference to any yellowish base and as he cites as a synonym of *A. pavonina* Lam. the *A. fulgens* J. Gay which has not yellowish base, it seems permissible to restrict his epithet *typica* to the entirely scarlet single-flowered form which is common near Athens, the first locality listed by him.

(b) A. PAVONINA var. PURPUREO-VIOLACEA (Boiss.) Halácsy

Anemone hortensis latifolia simpliciflore vi Clusius, Rar. Pl. Hist. 250, with figure (1601).

A. tenuifol. *Verdunia flore simpliciflore violaceo* De Passe, Hortus Floridus, t. 15 (c. 1614).

A. fulgens var. β *purpureo-violacea* Boissier, Fl. Orient. 1. 12 (1867).

A. pavonina var. β *purpureo-violacea* (Boissier) Halácsy, Consp. Fl. Graecae, 1. 5 (1900).

Tepals violet or rose, with a whitish base.

(c) A. PAVONINA var. OCELLATA (Moggridge) Bowles and Stearn

Anemone hortensis latifolia simpliciflore xvi Clusius, Rar. Pl. Hist. 253 (1601).

A. tenuifol. pavo flore simpliciflore De Passe, Hortus Floridus, t. 16 (c. 1614).

A. regina Risso, Fl. Nice, 6 (1844).

A. hortensis var. *ocellata* Moggridge, Contrib. Fl. Mentone, 3rd ed. t. 1 (1874), as to single-flowered form.

A. pavonina var. *regina* (Risso) Gürke in Richter, Pl. Europ. 2. 468 (1903).

Tepals 7 to 12, scarlet with a yellowish claw. Native of Greece but naturalized on the Riviera.

(d) A. PAVONINA var. PAVONINA (Lam.) Bowles and Stearn

Anemone hortensis latifolia Pavo major Clusius, Rar. Pl. Hist. 261 (1601).

A. latifolia Pavo dicta major, C. Bauhin, Pinax, 176 (1623).

A. pavonina Lamarck, Encycl. Méth. Bot. 1. 166 (1783).

A. hortensis var. α *pavonina* (Lam.) Grenier & Godron, Fl. France, 1. 14 (1847).

A. fulgens var. *duplex* Loret in Bull. Soc. Bot. France, 6. 33 (1859).

Tepals 20 or more, scarlet, with pale claws. Naturalized on the Riviera.

III. A. \times FULGENS J. Gay

A. pavonina ? β *fulgens*, De Candolle, Prod. 1. 18 (1824).

A. fulgens J. Gay ex Reichenbach, Icon. Pl. Crit. 3. t. 201 (1825).

A. hortensis γ *fulgens* Grenier & Godron, Fl. France, 1. 14 (1847).

Tepals usually 15 or more, narrow, scarlet ('Orient Red' Hort. Col. Chart 8 19/1). Naturalized in southern France.

Related plants found near Grasse and having 8 to 10 white, rose, red or purple tepals are *A. variata* Jordan in *Ann. Soc. Linn. Lyon*, n.s., 7. (for 1860) 427 in obs. (1861), reimpr. in Jordan, *Diagn. Esp. Nouv.* 1. 59 (1864), originally described as *A. versicolor* Jordan, *Pugillus* 1. (1852) non Salisbury (1796); *A. lepida* Jordan in *Ann. Soc. Linn. Lyon*, n.s., 7. (for 1860) 427 (1861), and *A. purpurata* Jordan, *loc. cit.* in obs. (1861), mentioned in Jordan, *Pugillus*, 2 (1852) as *A. versicolor* var. *flore intense purpureo*. There seems little doubt that these represent a hybrid swarm derived from the hybridization of the native *A. hortensis* and naturalized *A. pavonina* forms.

THE SOCIETY'S GARDENS BEHIND THE ROYAL ALBERT HALL

A. Simmonds, V.M.H.

ON March 2, 1858, H.R.H. THE PRINCE CONSORT, became President of our Society, in succession to the DUKE OF DEVONSHIRE who had died a few weeks earlier. At that time the Society was in need of a new site on which to hold its exhibitions which, during the previous thirty years, had been held in its garden at Chiswick. "The changing habits of society, the competition of other similar exhibitions in London itself, the power of locomotion to more distant places of recreation by railway, combined with the, at all times, uncertain nature of our climate, had in late years materially diminished that attendance of visitors upon which the income of the Society, and consequently its power of encouraging Horticulture, depended. It was under these circumstances that an opportunity of forming a Garden in the immediate vicinity of the Metropolis was sought." At the same time the Commissioners for the Exhibition of 1851, of whom the PRINCE CONSORT was President, required a site for their displays of works of art, etc. As it was considered that the somewhat similar objects of the two bodies might be attained by co-operation, and as His Royal Highness, as head of both bodies, was able to facilitate negotiations, at a meeting held at Buckingham Palace on June 27, 1858, he announced to the Council of our Society that the Commissioners were prepared to grant a lease of 22½ acres of their land at Kensington to the Society on certain terms.

The land was situated immediately behind (i.e. south of) the site now occupied by the Royal Albert Hall, between Exhibition Road and Queen's Gate, and was about 1,260 feet from north to south and about 800 feet wide from east to west. The Imperial Institute now occupies the centre of the site, and among other buildings which stand on it are the Imperial College of Science, the Royal College of Music, the London University Examination Halls and the Science Museum.

One of the terms of the lease was that the Society, "immediately after the execution by the said Commissioners of certain earthworks,



ANEMONE FULGENS AND A PAVONINA

FIG. 13—Above: *Anemone fulgens* J. Gay

Below: *A. pavonina* Lam. var. *ocellata* (Moggr.) Bowles & Stearn
[from an unpublished drawing by E. A. Bowles] (See p. 62)

L. Anemone: pavo flore simplici.

16.

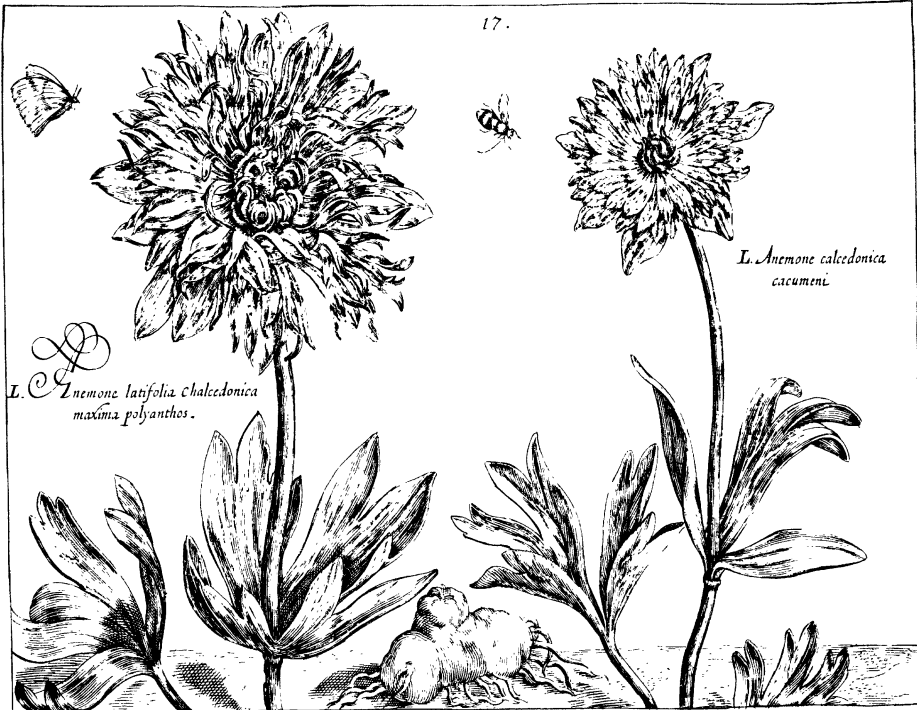
L. Anemone pavo Major.



FIG. 14—Left: *Anemone pavonina* Lam. var. *ocellata* (Moggr.) Bowles & Stearn

Right: *A. pavonina* var. *pavonina* (Lam.) Bowles & Stearn [from Crispian de Passe, *Hortus Floridus*, Tern. t. 16; c. 1614] (See p. 62)

17.



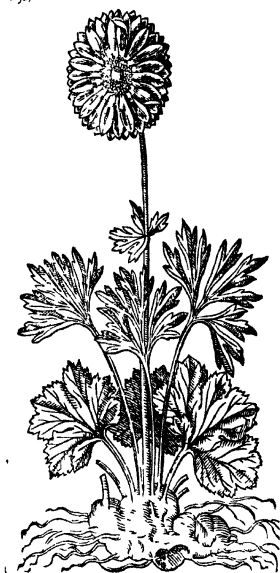
*L. Anemone latifolia Chalcidonica
maxima polyanthos.*

*L. Anemone chalcidonica
cacumini*

Fig. 16. *Anem. hort. latif. pleno flore coccineo.*

Anem. hortens. latifol. simpl. flore alba.

Anem. hortens. latif. simpl. flore rubea.



ANEMONE HORTENSIS AND A. PARONINA

FIG. 16—*Anemone paronina* var. *paronina* (Lam.) Bowles & Stearn. *Anemone hortensis latifolia pleno flore coccineo* Clusius [from Clusius, *Rariorum Plantarum Historia* 262 1601]

FIG. 17—*Anemone paronina* var. *ocellata* (Moggridge) Bowles & Stearn. *A. hortensis latifolia simpliflora* in Clusius [from Clusius, *Rariorum Plantarum Historia* 253 1601] (See p. 60)

FIG. 18—*Anemone hortensis* L.; *A. hortensis latifolia simpliflora* in Clusius [from Clusius, *Rariorum Plantarum Historia*, 249 1601] (See p. 59)

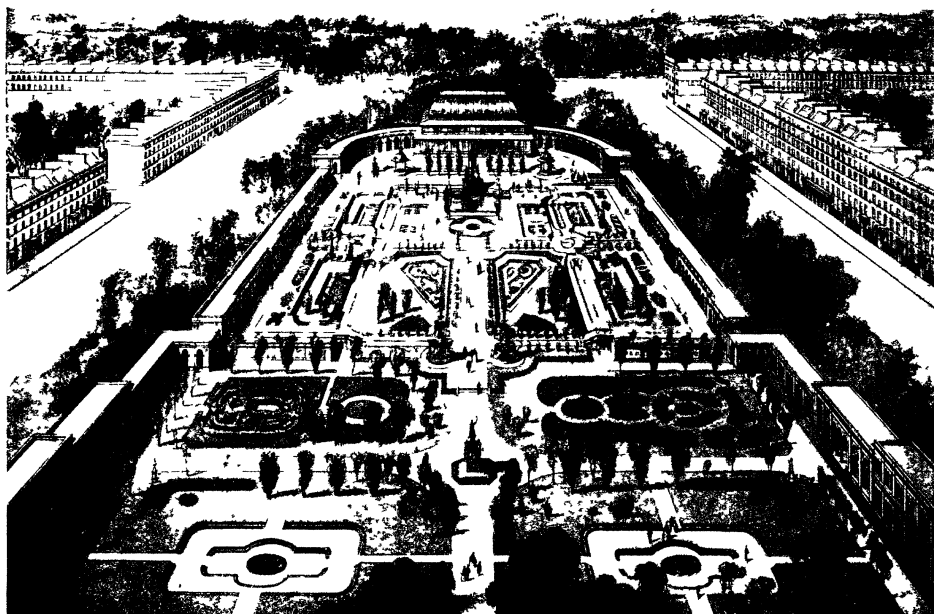


FIG. 19—View of the Royal Horticultural Society's Gardens from the site of the Natural History Museum, looking towards Kensington Gardens and Hyde Park (See p. 71)

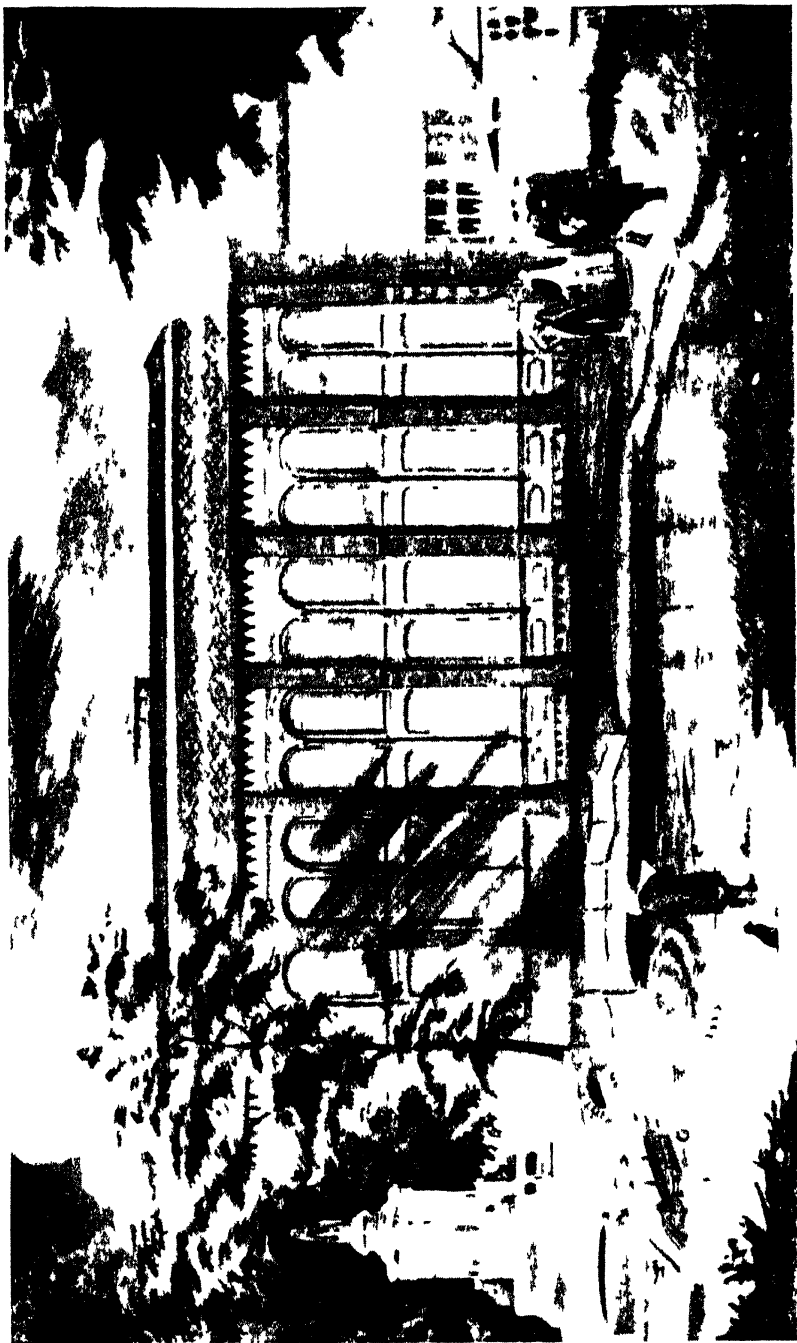


FIG. 20.—H. R. H. the Prince Consort inspecting a model of the Memorial of the Exhibition of 1851 erected experimentally on the Memorial site in the Royal Horticultural Society's Gardens. (See p. 72)



FIG. 22—*Picea pungens glauca* suffering from a severe attack of the Spruce Aphid, *Neomyzaphis abietina* Walker (See p 75)

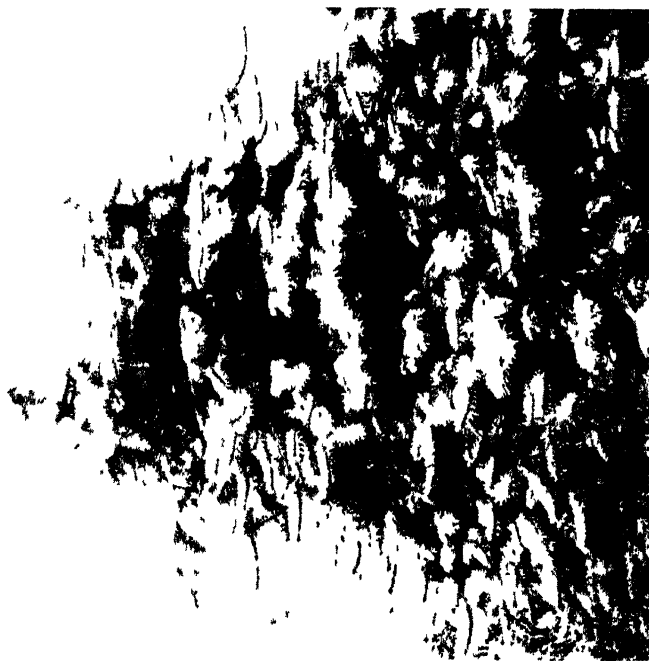


FIG. 21—*Picea pungens glauca* tree from Spruce Aphid attack (See p 75)



Photo, R. A. Mulby

FIG. 23—*Populus lasiocarpa* seedlings (See p. 79)



Photo, F. C. Brown

FIG. 24—Partial defoliation on *Picea pungens glauca* following Spruce Aphis attack (See p. 75)

should lay out and construct on the land an ornamental garden, with walks, trees, shrubs, terraces, steps, fountains, band-houses, statues, and vases; and at the north end of the said land a conservatory or winter garden, and expend not less than £50,000." On the other hand, the lease provided "that the Commissioners, . . . should at their own cost enclose the said land with arcades, . . . and that the Commissioners shall expend the sum of £50,000 about such earthworks, and in erecting the said arcades." The control of the finance and general management of the garden were to be vested in a joint committee of six, half the members being nominated by the Commissioners and half by the Society. These terms were presently embodied in a new Royal Charter granted by H.M. QUEEN VICTORIA on May 8, 1861, which stated, among other things, that whereas our Society had hitherto been known as the "Horticultural Society of London," "it is Our will and pleasure that such Society shall henceforth be called 'The Royal Horticultural Society'."

The nature of the garden which was constructed was described in considerable detail by ANDREW MURRAY in *The Book of the Royal Horticultural Society* (1863), and a fairly good idea of the layout may be obtained from the drawing produced as Fig. 19, which shows the view from what is now the site of the Natural History Museum looking towards Hyde Park and Kensington Gardens, which may be seen in the distance. The "conservatory or winter garden" which was 270 feet long, 100 feet wide and 75 feet high, is shown at the northern end. The Royal Albert Hall now stands between the site of the conservatory and Kensington Gore, the thoroughfare which at that point forms the southern boundary of Kensington Gardens. The "arcades" enclosing the garden may also be seen and considerable lengths of these still exist and constitute parts of the eastern and western galleries of the Imperial Institute. Above the arches of the western galleries one may still read the following remains of an inscription running for about 90 yards, on terra-cotta tiles, in raised 12-inch letters, each embellished with a human figure:

"THESE GARDENS COMMENCED DEC MCCCLIX WERE
FIRST OPENED TO THE PUBLIC V JUNE MCCCLXI
WITH South
Gallery
here ESIDENT OF THE ROYAL HORTICUL-
TURAL SOCIETY AND OF HER MAJESTYS COMMIS-
SIONERS FOR THE INTERNATIONAL North
Gallery
here
ABLISHED TO USE THE WORDS OF HIS ROYAL
HIGHNESS AS AN ATTEMPT AT LEAST TO REUNITE
THE SCIENCE AND ART OF GARDENING TO THE
SISTER ARTS OF ARCH".*

* The part of the arcade which carried the end of the inscription no longer exists, but the words were "Architecture, Sculpture and Painting."

The West Gallery originally had in similar tiles a quotation from BACON's essay on gardens, and the following part still exists above the arches at the southern end of the gallery:

**"BUILD STATELY SOONER THAN TO GARDEN FINELY
AS IF GARDENING WERE THE GREATER PERFECTION".**

From the outset QUEEN VICTORIA took a great interest in the formation of the garden and subscribed £1,000 towards its cost. Unfortunately the death of her mother, the DUCHESS OF KENT, prevented Her Majesty from performing the opening ceremony as she had intended, and in consequence the garden was formally opened on June 5, 1861, by the President, H.R.H. THE PRINCE CONSORT. The programme included the planting of a specimen of *Wellingtonia gigantea* by the Prince and the royal children, and in its report of the proceedings the *Gardeners' Chronicle* noted that little PRINCE ARTHUR (later, our Patron, the DUKE OF CONNAUGHT), "handled the spade with a vigour that showed him to have used well the experience gained in his own little garden at Osborne."

One of the features of the garden was the Memorial of the Exhibition of 1851 (*i.e.*, the International Exhibition which was held in the Crystal Palace in Hyde Park). This was originally intended to be surmounted by a statue of QUEEN VICTORIA, and the PRINCE CONSORT took a very great interest in the selection of the site. A water colour in the possession of our Society, and reproduced as Fig. 20, shows the Prince inspecting a model which had been erected for his approval. Unfortunately, before the work was completed, he died, and it was then decided that his statue should be substituted for that of Her Majesty. The Memorial, which may be seen in Fig. 19 in front of the conservatory, was unveiled on June 10, 1863, by H.R.H. THE PRINCE OF WALES (later H.M. KING EDWARD VII). When the garden was demolished the Memorial was moved on to the site which the conservatory had occupied and it still stands in that position just behind the Royal Albert Hall.

Another permanent feature of the garden was the great cascade flowing into a large rectangular basin immediately in front of the above-mentioned Memorial. The water was supplied by a pump from what was then the largest artesian well in London. Thence the water was conducted underground to a series of canals and fountains and returned by a deep culvert to the well.

The establishment of the garden was greatly appreciated and led to a considerable increase in the Fellowship of the Society. In 1867 it was reported that "the number of visitors to the gardens now amounts to as many as 200,000 a year . . . irrespective of visitors on the PRINCE CONSORT'S birthday in August, when the gardens are thrown open annually to the public free of charge, and no less than an average of 150,000 persons visit them."

However, owing to a variety of causes, that happy state of affairs did not continue. The joint use of the gardens by the Society and the Commissioners for the Exhibition of 1851 was not a success. The crowds of pure sightseers disheartened the really horticultural element among the Fellows, while the Society's share of the gate money was

not sufficient to enable the Society to meet its obligations to either the Commissioners or the debenture holders who had provided funds for the construction of the garden. In 1880 the Commissioners commenced legal proceedings against the Society in order to regain possession of the land. The case was eventually carried to the Court of Appeal where, in 1882, judgment was given in favour of the Commissioners, with costs, and the Society's lease was terminated in August of that year.

During the next few years our Society came perilously near to dissolution, as it had done on two previous occasions. Happily, however, the third lesson was taken to heart, and before the turn of the century a wiser financial policy, coupled with the consistent pursuit of horticulture, and horticulture alone, laid the foundation for the prosperous development of the last sixty years.

TWO INJURIOUS APHID PESTS OF CONIFERS

G. Fox Wilson

ENTOMOLOGIST, R.H.S. LABORATORY, WISLEY

IN view of the renewed post-war interest in the planting of ornamental trees, both as feature specimens in public parks, arboreta and gardens and as hedge plants, it is considered desirable to direct the attention of Fellows of the Society to the presence of two pests, which attack certain species of *Picea* (Spruce) and *Cupressus* (Cypress), and render them unsatisfactory unless measures are taken to combat them.

The pests concerned are Aphides, namely, (I) the Spruce Aphis, *Neomyzaphis* [*Myzaphis*] *abietina* Walker, and the (II) Cypress Aphis, *Neochmosis* [*Panimerus*] *cupressi* Buckton, which reduce the ornamental value of Spruces when grown as specimen trees and of Cypresses as hedge plants. Both species of Aphides occur more abundantly on trees growing in less favourable positions as regards soil and site, and the highest infestations are found on trees growing in ill-drained ground that is retentive of moisture, in light and sandy soils that dry out readily, and where the tree or hedge is in an exposed situation without the benefit of a wind-break.

Coniferous trees are as susceptible as ornamental deciduous trees to insect pests, which are, however, generally distinct. The choice of Coniferous trees is so wide that species other than those specially susceptible to these two pests may be chosen for special plantings, and with less chance that their ornamental and utilitarian value is affected.

(I) THE SPRUCE APHIS

Distribution.—This Aphis is widely distributed in the British Isles (12, 13, Cameron *in litt.*), and has been recorded as occurring in Austria (6), Canada (7), Germany (9), Holland (10), Ireland (3), New Zealand (5), Norway (13), and the North-Western United States (8).

Records of infestations received at the Society's Laboratory at Wisley are indicated (*Text Figure 1*).

Host Plants.—The genus *Picea* is the normal food plant of *N. abietina*, and Cunliffe (4) failed to establish this *Aphis* on either Pines, Silver Fir, Larch or Douglas Fir.

A number of *Picea species* are recorded as hosts both in this country (12, 13), on the Continent (9, 10), and elsewhere (5, 8).



TEXT FIG. 1—Distribution of Cypress (●) and Spruce Aphides (▲) in England, based upon evidence of infested material submitted to the Wisley Laboratory, 1921-47.

The recorded host plants at Wisley are set out in Table I, wherein the nomenclature follows that of Rehder, 1940, *Manual of Cultivated Trees and Shrubs*.

TABLE I

Host Plants	Susceptibility to Attack	Degree of Defoliation
<i>Picea Abies</i> , Norway Spruce	+++	Slight ; needles brown
<i>P. asperata</i>	+	Slight
<i>P. glauca</i> , White Spruce	+	Very Slight
<i>P. Koyamai</i>	—	—
<i>P. likiangensis</i>	(+)	Very Slight
<i>Picea likiangensis</i> var. <i>purpurea</i>	—	—
<i>Picea mariana</i> , Black Spruce	+	Partial
<i>Picea Omorika</i> , Servian Spruce	—	—
<i>P. orientalis</i> , Oriental Spruce	—	—
<i>P. polita</i> , Tigertail Spruce	—	—
<i>P. pungens</i> , Colorado Spruce	++	Partial
<i>P. pungens</i> var. <i>glauca</i>	++	Partial (Fig. 24)
<i>P. pungens</i> var. <i>Kosteriana</i>	++	None
<i>P. Schrenkiana</i>	—	—
<i>P. sitchensis</i> , Sitka Spruce	+++	Complete
<i>P. Smithiana</i> , Himalayan Spruce	+	Partial

(Degrees of Attack : Severely +++, Fairly Severely ++, and Slightly Infested + ; Apparently Immune —.)

Symptoms of Attack.—Injury by the Spruce Aphis is often attributable to other causes, *e.g.* unsuitable soil, drought and severe frost.

The degree of attack varies considerably on different species of

Spruce. Not only is this variation marked on distinct species, but may occur on adjoining trees of the same species (Figs. 21 and 22). The variability ranges from the browning of the foliage with premature leaf-fall, through partial to complete defoliation (Table I). These different effects may be observed on *P. Abies* and *P. pungens Kosteriana* upon which the needles turn brown, but the greater number persist and give the attacked trees the appearance of having been scorched by fire. Partial defoliation occurs on *P. pungens glauca*, and the infested branches become unsightly and present a 'leggy' appearance (Fig. 24). Complete defoliation invariably occurs in the case of the Sitka Spruce, *P. sitchensis*.

The first sign of attack on the needles of all species are small, round, yellow areas on the lower surface of the leaves, and arise from the puncturing of the tissues and the abstraction of sap by the piercing stylets of the Aphides. The two-year-old growths are the chief sufferers on such species as *P. pungens* (Fig. 24).

Years of Abundance.—The incidence of the Spruce Aphis is influenced by climatic conditions, and mild damp winters are specially favourable to the wingless viviparous females which continue to reproduce throughout the early months of the year. Colonies of Aphides are observed to flourish as early as January and February during a mild spell, and at a time when there are few natural enemies present on the trees to serve as controlling agents.

Theobald (13) stated that districts in which the Spruce Aphis is quite common one year may suddenly become comparatively free from it and, that after a lapse of time, it may occur again in quantity. This statement is borne out by observations made at Wisley over a period of 25 years, wherein severe infestations occurred every third or fourth year (Text Fig. 2). The years recorded by THEOBALD (13) in which actual damage was done were 1846, 1906 and 1913.



TEXT FIG. 2—Incidence of Spruce Aphis at Wisley, 1921-47

Description and Biology.—Descriptions of the wingless (apterous) and winged (alate) viviparous female Aphides are given by THEOBALD (12, 13), while the life history has been fully described by several authors, notably CUNLIFFE (4), DUMBLETON (5) and THEOBALD (*loc. cit.*).

The apterous viviparous female is olive green in colour, oval, with a darker line on each side of the body. The head is lighter green with the antennae half the length of the body. The cornicles are pale yellowish-green, some with a brownish tinge, and about one-quarter the length of the body, which is 1.0-1.5 mm. long. The legs are green with the posterior joints (tarsi) and the tips of the femora and the tibiae dusky.

The alate viviparous female is lighter green than the wingless form, and with large wings that are much longer than the body, which is 1.0-1.8 mm. in length.

Wingless females may be found on the needles throughout the year, while the winged females may appear as early as the end of March, but are most abundant during June to August. Some reproduction of living young by the apterous females may occur throughout a mild winter.

The aphides occur usually on the underside of the needles, and one may observe a single aphid to settle on a needle and to give rise within a few days to a colony of living young. The rate of reproduction was demonstrated experimentally by CUNLIFFE (4). The young aphides wander about and settle on the leaves so that, under favourable conditions, the entire leaf area becomes thickly infested. The new growth that appears in May does not appear to be invaded to any extent during the summer months, but becomes infested in autumn and winter.

Natural Enemies.—The Spruce Aphis is the prey of a number of predatory and parasitic insects, namely, Ladybirds, and their larvae, the larvae of Lace-wing and Hover Flies, Wasps and parasitic Hymenoptera, including a species of *Praon* (11). In addition, THEOBALD (13) records the importance of several Spiders, including at least two species of *Phalangidae* or "Harvest Men", and further remarks that the most interesting enemy of this aphid is the Long-Eared Bat, which assiduously hunts both for the winged and the wingless Aphides. Tits and Tree-Creepers have been observed to feed upon the wingless Aphides, which they peck from the needles in spring and summer.

In spite of the number of controlling agents, little effect is made upon the pest when conditions are favourable to their rapid increase. The absence of predatory and parasitic insects during the earlier months of the year is responsible for the extent to which high populations are rapidly built up in late winter and early spring.

Control Measures.—Winter treatment with a Tar Oil wash at a concentration of 5 per cent. is the most effective method of control provided that the application is thorough and forceful, and that the wash is directed to the underside of the leaves and shoots to ensure the complete wetting of the wingless Aphides. This treatment was advocated by RITZEMA BOS (10), who recommended an application of 6 to 8 per cent. Carbolineum in winter. Spring and summer infestations are readily controlled by Contact Washes, namely, Nicotine-soap, Liquid Derris and Pyrethrum extract, and by Nicotine dust when applied at air temperatures above 65° F. At and above this temperature, rapid volatilization of the Nicotine occurs, and the vapour penetrates into the infested shoots. Dusting is more effective than wet spraying in controlling attacks of Spruce Aphis on closely-planted trees in nursery rows.

(II) THE CYPRESS APHIS

Distribution.—There are far fewer records of this Aphis than with the Spruce Aphis, and it is suggested that it is frequently overlooked both on account of its position on the tree, namely, the stem, branches and shoots; and by reason of its colour which tones with those portions of its host plant upon which it is found. Several records of its occurrence on *Cupressus macrocarpa* have been received at the Society's Laboratory at Wisley and was first recorded in 1879 from Probus,

Cornwall (2, 14), where it was described as doing serious injury to Cypresses in the neighbourhood.

Host Plants.—The only recorded food plant is *Cupressus macrocarpa*, which is grown extensively as a hedge plant, and as specimen trees in gardens and parks.

Symptoms of Attack.—The presence of this *Aphis* in colonies on the stem, branches and shoots considerably reduces the vigour of infested plants both directly through the abstraction of sap, and indirectly from the excretion of honeydew that drips on to the foliage and shoots and forms a matrix favourable to the growth of non-parasitic fungi, namely Sooty Moulds. The deposit of honeydew, together with the subsequent growth of Sooty Moulds, prevents the normal functions of the leaves—assimilation and respiration.

The Aphides are frequently overlooked on attacked plants, but the growth of Sooty Moulds usually provides the first indication of an attack. The effect of a severe infestation is a serious die-back of the shoots, which is often attributable to other causes, e.g. severe winter conditions and to a prolonged spring and summer drought.

Years of Abundance.—The Cypress *Aphis* was reported as doing considerable injury in 1879 in Cornwall (*loc. cit.*), and was specially abundant in 1923 on specimen trees in the Pinetum at the Society's Gardens at Wisley, and on hedge plants at West Byfleet. Attacks occur at intervals, and years during which high infestations have occurred at Wisley were 1923, 1935, 1937 and 1939.

Description and Biology.—BUCKTON (2) and THEOBALD (14) have described the apterous and alate viviparous females, but there is a considerable dearth of literature relating to its biology.

The wingless viviparous female is of various shades of pale to dark brown—its colour harmonizing with that of the stem and branches upon which it feeds. The antennae and legs are coloured as the body, while the eyes and cornicles are deep shiny brown to black. The antennae are shorter than the head and thorax, the abdomen has rows of small spots and is covered with short hairs, the legs are longish and rather thick, and the rostrum is long and modified for penetrating thicker tissue than that of the Spruce *Aphis*. The length of the body is 2.0–2.2 mm.

The winged viviparous female is similarly coloured, but has a more hairy body.

The Cypress *Aphis* occurs on its food plant throughout the year, and the highest populations have been found to occur during the months of March, May, June, July and September.

Natural Enemies.—It would appear that the colour of the Aphides in closely harmonizing with those portions of the plant upon which they feed, provides a natural protection from predatory insects. It may, also, be that the Aphides are distasteful to the larvae of Ladybirds, Hover and Lace-wing Flies, for only occasionally have these predators been found on Cypresses infested with this pest.

Control.—Infestations that occur during mild winters in January to March, are readily controlled with an application of a 5 per cent. Tar Oil wash, provided that it is thoroughly and forcefully applied to permit

penetration into the plants. It is essential to ensure that the Aphides, which are situated on the main stem and on both surfaces of the branches and shoots, are well wetted by the spray fluid.

Attacks that occur in the spring, summer and autumn are effectively controlled with a Nicotine dust applied at air temperatures above 65° F. This dust will provide a far more effective control than a wet spray in the case of a thick hedge owing to the difficulty of reaching the insects with a low-powered spraying unit.

Acknowledgements.—The author expresses his sincere thanks to DR. A. E. CAMERON (University of Edinburgh), for information relating to the presence of Spruce Aphis in Scotland; and to his colleagues MR. F. C. BROWN, for the photographs illustrating this article, and MR. N. K. GOULD (Botanist), for his help in the nomenclature of *Picea species* in the Wisley Collection.

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NOTES FROM FELLOWS

Populus lasiocarpa

WHEN this fine Chinese Poplar was introduced to cultivation by the late E. H. WILSON he found it necessary to send young plants to MESSRS. VEITCH, of Combe Wood, because seeds of Poplars in common with those of Willows must be sown immediately they are ripe, and cannot be stored away in packets for future attention.

It is stated in the *Botanical Magazine* (Table 8625) that only one living plant was sent home by WILSON, but this statement is corrected in *Plantae Wilsonianae*, where he records sending back about a dozen small specimens.

During the past three summers a fine specimen tree, some thirty-five feet high, growing near the main entrance to The Nursery, at Woodbridge, Suffolk, has produced a mass of downy catkins. In 1947 a particularly good crop was borne, and for several weeks in the summer the surface of the ground near the tree, and all the shrubs and hedges in its vicinity, were covered with masses of what appeared at first to be cotton wool.

On examination it was found that a considerable number of good seeds had developed, and several of these were saved and sown at once. They were given artificial treatment in a warm propagating house and germinated within forty-eight hours of sowing, but, as has happened previously in my experience with seedlings raised from hard-wooded plants in the heat of summer, they failed to thrive, and the percentage surviving in October was small.

To compensate for this loss, however, it was with great pleasure that a number of seedlings were observed growing naturally in a frame some fifteen yards from the tree. This frame had been planted out with young plants of varieties of *Hibiscus syriacus*, which received frequent watering and, towards the front of the frame where the soil benefited by the shade cast from the wooden side, a number of robust young Poplars were growing (see Fig. 23). These were carefully transplanted and show promise of growing into good trees. The lovely red leaf stalks and venation so faithfully reproduced in the *Botanical Magazine* figure were most conspicuous.

F. P. KNIGHT

The Lost Scent of Mimulus moschatus

Two notes on this subject have appeared recently in the R.H.S. JOURNAL. In the July 1947, issue, MR. W. BALFOUR GOURLAY, states that: "A scented form occurred among plants in the R.H.S. Garden from the seed which DOUGLAS sent home in 1826. This 'sport,' if such it was, doubtless sprang from one seed only and would subsequently have been reproduced by vegetative reproduction."

Granted that such was the case, the loss of scent from all the plants in cultivation at about the same time was remarkable, but not more so, than that a certain variety of the florists' Chrysanthemum that has also been propagated vegetatively and widely distributed will sport during a certain year in places hundreds of miles apart, similar flowers being produced in each place. Thus 'Étoile de Lyon' one of the first really large Japanese varieties sported a handsome bronze flower in the garden of MR. F. LLOYD, Croydon and at Nymans the same year. The sport was named 'Jessie Cottie.' This season 'Imperial Pink' a very beautiful pink, has sported with a market grower at Slough and also at Nymans to a rather dull bronze not worth retaining. As those who can speak of the scent of the Musk plant from experience will soon be in the minority, I should like to record what was a known fact in connection with its scent. Having once obtained a delicious whiff of it either intentionally or accidentally in passing, you could not repeat the sensation for a while. I have often tested this, and found it correct, at least as far as I was concerned.

What was the origin of *Mimulus Harrisonii*? It was grown at Wakehurst place in 1881. A dwarf plant with leaves somewhat of the same shape as the hybrid *Mimulus* of to-day, slightly downy, clammy when handled and strongly musk-scented, flowers large and slightly spotted. It was grown as a pot plant. NICHOLSON mentions it in the general description of the genus. Speaking of the Common Musk, the writer

adds, "Its variety *Harrisonii* is a strong-growing large-flowered form which has become equally as popular as the type. It makes an excellent pot plant." What has become of it? It was presumably a cross between *M. moschatus* and some other species and derived its scent from the former. If a seedling it had a distinct "life" and should not be affected by any vagaries of the musk-scented parent.

MR. J. P. HUDSON in the January 1948 issue of the R.H.S. JOURNAL mentions rumours of the continued existence of scented musk in New Zealand and the probability of its having been planted there by miners. As a rule the cultivated plant is choked out by the native, but not always. My son, when collecting in the Argentine Andes, was able to obtain Apples from wild trees—probably seedlings from those originally imported by the Jesuit missionaries.

JAMES COMRER, V.M.H.
Nymans Gardens, Handcross, Sussex

WISLEY TRIALS, 1947

NARCISSUS AT WISLEY, 1946-47

One hundred and twenty varieties were planted in the autumn of 1945 on the western side of Battleston Hill. Of these, thirty-one had been selected for trial, as varieties suitable for garden decoration, by the Narcissus and Tulip Committee; the remainder were grown for comparison and judgment. Most of these had received awards for garden decoration after trial, in previous years.

Twenty-five bulbs of each variety were given the warm water treatment before planting to ensure that neither eelworms nor the larvae of the Narcissus flies should interfere with their growth, and on the whole the varieties planted made satisfactory clumps. The trial beds were covered each year with tiffany to prevent attack by the large Narcissus fly, *Merodon equestris*, from the end of April to the end of July. In the future, it is proposed that dusting with a 5 per cent. D.D.T. dust, will replace the screening of the beds. (See Daffodil Year Book, 1947.)

The trial was inspected several times during the spring of 1946 and 1947 by the Narcissus and Tulip Committee and their judgment for recommendations for Awards was made in both 1946 and 1947. The report indicates the Committee's recommendations, also the present state of the trials—varieties retained for future judgment and for comparison against which newcomers are judged—varieties deleted from the trials.

The flowering period given is for 1947; this on the whole is ten to fourteen days later than in 1945-46.

DIVISION 1a

Dandy Boy (raised by Mr. G. H. Engleheart and sent by Messrs. R. H. Bath, Ltd., The Floral Farms, Wisbech, Cambs.). A.M. April 18, 1947.—Described R.H.S. JOURNAL 61, p. 303. Flowers in first year, 32, in third 66 (H.C. 1936).

Garron (raised, introduced and sent by Mr. Guy L. Wilson, The Knochan, Broughshane, Co. Antrim). A.M. April 12, 1946. Described R.H.S. JOURNAL, 72, p. 253. Flowers in first year 22, in third 107.

Golden Ray (raised by Mr. Warnaar and sent by Messrs. de Graaff-Gerharda, Lisse, Holland). *A.M.* May 5, 1947. Described in *R.H.S. JOURNAL*, 61, p. 303 (*H.C.* 1939). Flowers in first year 27, in third 77.

Kandahar (raised by The Brodie of Brodie and sent by Mr. Guy L. Wilson, The Knockan, Broughshane, Co. Antrim). *A.M.* April 18, 1947. Flowering from April 15 to May 6. Vigorous with bright grey-green foliage and 20-inch stems at flowering time, well above the foliage. Flower $4\frac{1}{2}$ inches diameter; perianth segments $1\frac{3}{4}$ inch long, flat, overlapping for half their length, Lemon Yellow (*H.C.C.* 4), corona expanded at mouth, $1\frac{1}{2}$ inches deep, Lemon Yellow (*H.C.C.* 4). Flowers 17 in first year, 52 in third.

The following varieties have been retained: BRANDON (*A.M.* 1936); CHARLES I (*A.M.* 1939); DECENCY (*F.C.C.* 1944); GODOLPHIN; LA PRINCIPAL; MUSKETER (*A.M.* 1941); SOLFERINO (*A.M.* 1936); SULPHUR PRINCE (*A.M.* 1939); WRESTLER (*A.M.* 1936); YELLOW BEAUTY (*H.C.* 1936).

The following varieties have been deleted from the trials: MAXIMUS SUPERBUS (*C.* 1936); SULPHUR (*A.M.* 1936); WORLINGTON (*A.M.* 1939).

DIVISION 1b

Pacific (raised and sent by Messrs. de Graaff-Gerharda, Lisse, Holland). *A.M.* April 2, 1946. Described *R.H.S. JOURNAL*, 61, p. 304. (*H.C.* 1936).—Flowers 34 in first year, 91 in the third.

The following varieties have been retained: MRS. E. H. KRELAGE (*A.M.* 1944); ROXANE (*A.M.* 1936).

DIVISION 1c

Boswin (raised by the late P. D. Williams, Esq., and sent by Cmdr. A. M. Williams, R.N., Werrington Park, Launceston, Cornwall). *A.M.* April 2, 1946. Described in *R.H.S. JOURNAL*, 72, p. 252. Flowers 22 in first year, 86 in the third.

Fingal (raised, introduced and sent by Messrs. R. H. Bath, Ltd., The Floral Farms, Wisbech, Cambs.). *A.M.* April 2, 1946. Described *R.H.S. JOURNAL*, 72, p. 253. Flowers 23 in first year, 71 in the third.

Glenravel (raised, introduced and sent by Mr. Guy L. Wilson, The Knockan, Broughshane, Co. Antrim). *H.C.* April 2, 1946. Described *R.H.S. JOURNAL*, 72, p. 253. Flowers 19 in the first year, 81 in the second.

The following variety has been retained: MRS. E. C. MUDGE (*A.M.* 1936).

The following variety has been deleted from the trials: BAMBOULA (*C.* 1936).

DIVISION 2a

Crocus (raised by the late P. D. Williams, Esq., and sent by M. P. Williams, Esq., Lanarth, St. Keverne, Cornwall). *A.M.* April 28, 1947. Described *R.H.S. JOURNAL*, 72, p. 252. (*H.C.* 1946). Flowers 25 in first year, 59 in the third.

Fortune (raised and introduced by the late Mr. Walter T. Ware and sent by Messrs. R. H. Bath, Ltd., The Floral Farms, Wisbech, Cambs.). *A.M.* April 18, 1947. Flowering from April 9 to May 3, 1947. Very vigorous with 24 inch stems, well above the foliage. Flowers $4\frac{1}{2}$ inches diameter; perianth segments $1\frac{3}{4}$ inches long, flat, overlapping for half their length, Mimosa Yellow (*H.C.C.* 602), corona $1\frac{1}{2}$ inch deep, expanded at mouth, Tangerine Orange (*H.C.C.* 9) paler towards the base. Flowers 31 in first year, 72 in the third.

Marksman (raised by Miss G. Evelyn and sent by Cmdr. A. M. Williams, R.N., Werrington Park, Launceston, Cornwall). *A.M.* April 28, 1947. Flowering from April 17 to May 3, 1947. Vigorous with 18 inch stems. Flowers $4\frac{1}{2}$ inches diameter; perianth segments $1\frac{3}{4}$ inch long, flat, overlapping for half their length, a brighter shade of Mimosa Yellow with a golden sheen (*H.C.C.* 602); corona basin-shaped, $\frac{5}{8}$ inch deep, mouth expanded,

Persimmon-Orange, suffused with yellow at the base (H.C.C. 710/1). Flowers 27 in the first year, 76 in the third.

Orange Bird (raised, introduced and sent by Messrs. Barr & Sons, 11-13 King Street, Covent Garden, London, W.C. 2). A.M. April 18, 1947. Described R.H.S. JOURNAL, 72, p. 253. (H.C. 1946). Flowers 37 in the first year, 93 in the third.

Yellow Poppy (raised by Messrs. Cartwright and Goodwin, and sent by Messrs. R. A. Vanderschoot, Ltd., Hillegom, Holland). A.M. April 28, 1947. Described R.H.S. JOURNAL, 61, p. 307. (H.C. 1936). Flowers 29 in the first year, 82 in the third.

Carbineer (raised and sent by Mr. A. M. Wilson and sent by Messrs. Farrow & Son, Holbeach, St. Marks, Spalding, Lincs.). H.C. April 12, 1946. Described R.H.S. JOURNAL, 72, p. 252. Flowers 33 in the first year, 94 in the third.

The following varieties have been retained: AMBULE (A.M. 1936); BOKHARA; CHEERIO; COVERACK GLORY (H.C. 1936); GARIBALDI (A.M. 1936); HAVELock (F.C.C. 1936); HELIOS (A.M. 1936); JUBILANT (F.C.C. 1944); KILLIGREW (A.M. 1936); NIMROD *syn.* CARLTON (F.C.C. 1939); PEPPER (C. 1939); RED DEFIANCE (A.M. 1936); ST. IVES (A.M. 1939); SUNPROOF ORANGE; WHITELEY GEM; YELLOW BIRD (A.M. 1936).

The following varieties have been deleted from the trials: BUTTER BOWL (H.C. 1936); TREASURE (C. 1936).

DIVISION 2b

Bodilly (raised by the late P. D. Williams, Esq., and sent by Messrs. Barr & Sons, 11-13 King Street, Covent Garden, London, W.C. 2). A.M. April 2, 1946. Described R.H.S. JOURNAL, 72, p. 252. Flowers 22 in the first year, 71 in the third.

Leslie Hulbert (raised, introduced and sent by the Rev. Canon Rollo Meyer, Manor End, Little Gaddesden, Berkhamsted, Herts.). A.M. April 12, 1946. Described R.H.S. JOURNAL, 72, p. 253. Flowers 24 in the first year, 72 in the third.

Rewa (raised by Dr. Lower and sent by Mr. P. Lower, Eastdon House, Starcross, S. Devon). A.M. April 2, 1946. Described R.H.S. JOURNAL, 61, p. 309. (H.C. 1936). Flowers 44 in the first year, 87 in the third.

Zeeland (raised by Messrs. de Graff-Gerharda, introduced by Messrs. F. Rijnveld & Sons and sent by Messrs. Farrow & Sons, Holbeach, St. Marks, Spalding, Lincs.). A.M. May 5, 1947. Described R.H.S. JOURNAL, 72, p. 254. (H.C. 1946). Flowers 23 in the first year, 66 in the third.

Favell Lee (raised, introduced and sent by the Rev. Canon Rollo Meyer, Manor End, Little Gaddesden, Berkhamsted, Herts.). H.C. April 28, 1947. Vigorous, with erect 25-inch flower stems, well above the foliage. Flowers $3\frac{1}{2}$ inches diameter; perianth segments $1\frac{1}{2}$ inch long, flat, overlapping for two-thirds of their length, creamy-white; corona $\frac{1}{2}$ inch deep, expanded at the mouth, Canary Yellow (H.C.C. 2). Flowering from April 23 to May 13, 1947. Flowers 21 in the first year, 66 in the third.

The following varieties have been retained: EVA (A.M. 1936); FOLLY (F.C.C. 1936); MARION CRAN (A.M. 1936); NISSA; ORANGE CRINOLINE; WARLOCK (F.C.C. 1939).

The following variety has been deleted from the trials: SIMLA (C. 1936).

DIVISION 3a

Gulliver (raised by the late P. D. Williams, Esq., and sent by Messrs. Farrow & Sons, Holbeach St. Marks, Spalding, Lincs.). A.M. April 28, 1947. Described R.H.S. JOURNAL, 67, p. 104 (C. 1941). Flowers 20 in the first year, 66 in the third.

The following varieties have been retained: DINKIE (A.M. 1936); LUCCOMBE; MARKET MERRY; NANNY NUNN (H.C.C. 1936); TREDORE.

DIVISION 3b

Sandringham (raised, introduced and sent by Messrs. R. H. Bath, Ltd., The Floral Farms, Wisbech, Cambs.). H.C. April 28, 1947. Vigorous, with erect foliage; flower stems 19 inches long. Flowers 3 inches diameter; perianth segments $1\frac{3}{8}$ inch long, flat, overlapping for two-thirds of their length, white; corona $\frac{1}{2}$ inch deep, flat, saucer-shaped, Aureolin (H.C.C. 3/1), changing at margins to Persimmon Orange (H.C.C. 710). Flowering from April 26 to May 14, 1947. Flowers 13 in the first year, 57 in the third.

The following varieties have been retained: ARCADIA; MING (H.C. 1936); PRINCE (A.M. 1944); SUNSTAR; TURIN.

The following varieties have been deleted from the trials: FLOORE; SUNRISE (A.M. 1936).

DIVISION 4a

Snow Queen (sent by Messrs. R. A. Vanderschoot, Ltd., Hillegom, Holland). F.C.C. May 5, 1947. Described R.H.S. JOURNAL, 61, p. 312 (A.M. 1939). Flowers 34 in the first year, 104 in the third.

Brunswick (raised by the late P. D. Williams, Esq., and sent by Cmdr. A. M. Williams, R.N., Werrington Park, Launceston, Cornwall). A.M. April 18, 1947. Vigorous; flower stems erect, 22 inches long. Flowers 4 inches diameter; perianth segments $1\frac{3}{8}$ inch long, flat, overlapping for half of their length, creamy-white; corona $1\frac{3}{8}$ inch deep, expanded at the mouth. Primrose Yellow (H.C.C. 601), paler at the base. Flowering from April 9 to May 1, 1947. Flowers 24 in the first year, 64 in the third.

Denys Meyer (raised, introduced and sent by the Rev. Canon Rollo Meyer, Manor End, Little Gaddesden, Berkhamsted, Herts.). A.M. April 18, 1947.—Vigorous; flower stems erect, 18 inches long. Flowers 4 inches diameter; perianth segments $1\frac{3}{8}$ inch long, very flat, overlapping for half of their length, creamy-white; corona $1\frac{1}{2}$ inch deep, Naples Yellow (H.C.C. 403/1) fading to creamy-white at base. Flowering from April 13 to May 1, 1947. Flowers 35 in the first year, 93 in the third.

The following varieties have been retained: CICELY (A.M. 1936); GRAYLING (A.M. 1936); HERA (A.M. 1936); MARMORA (F.C.C. 1936); MILKMAID (H.C. 1936); SEASHELL (A.M. 1944); TUNIS (F.C.C. 1936).

The following varieties have been deleted from the trials: EDRIC; GIRDLE (H.C. 1939); GLENEVE *syn.* VESPA (C. 1941); MAY (C. 1936); MITYLENE (A.M. 1936); WHITE DELIGHT (C. 1936); WHITE MAIDEN (H.C. 1936).

DIVISION 4b

The following variety has been retained: SILVER CIRCLE.

DIVISION 5a

Rippling Waters (raised, introduced and sent by Messrs. Barr & Sons, 11-13 King Street, Covent Garden, London, W.C. 2). F.C.C. April 28, 1947. Described R.H.S. JOURNAL, 72, p. 253. (A.M. 1946). Flowers 22 in the first year, 72 in the third.

The following varieties have been retained: HAPPY EASTER; NIVETH (H.C. 1936).

DIVISION 6

Bartley (raised by J. C. Williams, Esq., and sent by Col. F. C. Stern, O.B.E., Highdown, Goring-by-Sea, Sussex). A.M. April 2, 1946. Described R.H.S. Journal, 72, p. 252. Flowers 32 in the first year, 61 in the third.

The following varieties have been retained: BERYL (A.M. 1936); FAIRY WINGS (C. 1941); ORANGE GLORY (A.M. 1936).

DIVISION 7

The following varieties have been retained: AURELIA (A.M. 1936); GOLDEN PERFECTION (A.M. 1944); GOLDEN SCEPTRE (F.C.C. 1936); HESLA (A.M. 1936); LANARTH (F.C.C. 1936); TREVITHIAN (F.C.C. 1936); YELLOW PRIZE (A.M. 1936).

DIVISION 8

The following varieties have been retained: BETHA; GLORIOUS (A.M. 1936); SCARLET GEM (F.C.C. 1936); WHITE'S HYBRID (A.M. 1939).

DIVISION 9

Actaea (raised and introduced by Messrs. G. Lubbe & Son and sent by Messrs. R. H. Bath, Ltd., The Floral Farms, Wisbech, Cambs.). H.C. April 28, 1947.—Vigorous; flower stems 22 inches tall. Flowers $3\frac{1}{2}$ inches diameter; perianth segments $1\frac{1}{2}$ inch long, broad, flat, overlapping for half of their length, white; corona $\frac{3}{8}$ inch deep, flat saucer-shaped, Aureolin (H.C.C. 3/1) edged Indian Orange (H.C.C. 713). Flowering from April 22 to May 11, 1947. Flowers 23 in the first year, 51 in the third.

The following varieties have been retained: FAIR LADY (A.M. 1931); SARCHEDON (A.M. 1944); YPSILANTE.

DIVISION 10

The following varieties have been retained: BUTTERMILK (H.C. 1936); CHEERFULNESS (F.C.C. 1939); FEU DE JOIE (A.M. 1944); MARY COPELAND (A.M. 1936); MRS. WM. COPELAND (A.M. 1944).

CORNFLOWERS AT WISLEY 1946-47

Fourteen stocks of Cornflowers were received at Wisley for trial; these were sown in the open, in rows $1\frac{1}{2}$ feet apart on September 11, 1946. As soon as the seedlings were large enough, they were "singled" out in the rows 1 to 2 inches apart; except for keeping them free from weeds, no other attention was given until late March when they were given their final thinning so that the plants were spaced 4 to 6 inches apart in the rows. All made good growth in spite of the severe winter, and were finally judged by a sub-committee of Floral "A" Committee on June 12, 1947, whose recommendations for awards are given below.

FLOWERS WHITE

Double White, Extra Select (raised, introduced and sent by Messrs. Watkins & Simpson, Ltd., 27 Drury Lane, Covent Garden, London, W.C. 2). A.M. June 12, 1947.—3 feet tall; flower stems 18 inches long; flowers double, $1\frac{1}{2}$ inch diameter, white. A regular, true and free flowering stock. SNOW MAN (Wm. Macdonald Seed Co.), mixed.

FLOWERS OF PINK SHADES

DOUBLE PINK SELECTED (Nutting); DOUBLE ROSE (Bunting); DOUBLE ROSE, EXTRA SELECT (Watkins & Simpson); PINKIE (Wm. Macdonald Seed Co.), mixed.

FLOWERS CARMINE

Double Carmine Rose, Extra Select (raised, introduced and sent by Messrs. Watkins & Simpson, Ltd., 27 Drury Lane, Covent Garden, London, W.C. 2). H.C. June 12, 1947.— $3\frac{3}{4}$ feet tall; flower stems 18 inches long; flowers mostly semi-double, a few double, $1\frac{1}{2}$ inch diameter, Crimson (H.C.C. 22/1).

FLOWERS ROSE-RED

RED BOY (Wm. Macdonald Seed Co.), a very mixed stock.

FLOWERS MAUVE

Double Mauve, Extra Select (raised and sent introduced by Messrs. Watkins & Simpson, Ltd., 27 Drury Lane, Covent Garden, London, W.C. 2). H.C. June 12, 1947.—3 feet tall; flower stems 18 inches long; flowers semi-double, $1\frac{1}{2}$ inch diameter, a shade between Mauve (H.C.C. 633) and Cobalt Violet (H.C.C. 634). An even stock in growth and colour.

FLOWERS OF BLUE SHADES

Double Blue, Extra Select (raised, introduced and sent by Messrs. Watkins & Simpson, Ltd., 27 Drury Lane, Covent Garden, London, W.C. 2).

H.C. June 12, 1947, as an early flowering strain.— $3\frac{1}{2}$ feet tall; flower stems 18 to 22 inches long; flowers mostly semi-double, $1\frac{1}{2}$ inch diameter, Corn-flower Blue (H.C.C. 742/2). Most flowers mature together, not in succession. **JUBILEE GEM** (Watkins & Simpson), 1 foot tall, varies in height; **BLUE BOY** (Wm. Macdonald Seed Co.); **DOUBLE BLUE** (Bunting), many singles; **DOUBLE BLUE SELECTED** (Nutting), many singles.

LARKSPURS AT WISLEY, 1946-47

Twenty-seven stocks of Larkspurs were sent for trial in 1946. They were sown in the open, on September 3, 1946, in rows $1\frac{1}{2}$ feet apart. As soon as the plants were large enough to handle, they were "singled" to 2 to 3 inches apart in the rows. In spite of the severe winter, all made good growth. In early April, the plants were thinned to 8 to 9 inches apart in the rows. They were finally judged by a sub-Committee of Floral "A" Committee on July 3, 1947, who made their recommendations for awards as given below.

FLOWERS WHITE

Double White (raised, introduced and sent by the Wm. Macdonald Seed Co., Santa Maria, California, U.S.A.). **A.M.** July 3, 1947. Plants $4\frac{1}{2}$ feet tall, of erect, upright and compact branching habit. Flowers $1\frac{1}{2}$ inch diameter, good quality, white. A true, even stock.

White King (raised and introduced by Messrs. Bodger Seeds, Ltd., El Monte, Los Angeles County, California, U.S.A., and sent by Messrs. Watkins & Simpson, Ltd., 27 Drury Lane, Covent Garden, London, W.C. 2). **H.C.** July 3, 1947.—Plants 5 feet tall, of erect, upright and compact branching habit. Flowers $1\frac{1}{2}$ inch diameter, white. A true and regular stock.

DWARF STOCK-FLOWERED WHITE (Ferry Morse Seed Co.), dwarf habit; **SUPER MAJESTIC WHITE** (Ferry-Morse Seed Co.).

FLOWERS VERY PALE PINK

SUPER MAJESTIC LIGHT PINK (Ferry-Morse Seed Co.).

FLOWERS OF SALMON-PINK SHADES

DWARF STOCK-FLOWERED SALMON-PINK (Ferry-Morse Seed Co.), dwarf habit; **LOS ANGELES** (Bunting) varied in colour; **MISS CALIFORNIA** (Watkins & Simpson), varied in shade; **SUPER MAJESTIC ROSE-PINK** (Ferry-Morse Seed Co.); **SUPER MAJESTIC DEEP ROSE-PINK** (Ferry-Morse Seed Co.).

FLOWERS OF ROSE-PINK SHADES

Dwarf Stock-Flowered Rose Pink (raised, introduced and sent by Messrs. Ferry-Morse Seed Co., San Francisco, California, U.S.A.). **A.M.** July 3, 1947.—Plants $2\frac{1}{2}$ feet tall, of very compact, erect habit. Flowers $1\frac{1}{2}$ inch diameter, Phlox Pink (H.C.C. 625/1) shaded at margins of petals with (H.C.C. 625). A very true and even stock.

Giant Imperial Brilliant Rose (raised, introduced and sent by Messrs. Ferry-Morse Seed Co., San Francisco, California, U.S.A.). **A.M.** July 3, 1947.—Plants 4 feet tall, of erect upright, and compact branching habit. Flowers $1\frac{1}{2}$ inch diameter, Crimson (H.C.C. 22/1). A true and even stock.

Giant Imperial "Rosalie" (raised, introduced and sent by Messrs. Ferry-Morse Seed Co., San Francisco, California, U.S.A.). **A.M.** July 3, 1947.—Plants 4 feet tall, of erect, upright and compact branching habit. Flowers $1\frac{1}{2}$ inches diameter, Phlox-Pink (between H.C.C. 625/1 and 625). A true and even stock.

GIANT IMPERIAL ROSE (Bodger Seeds, Ltd.), stock mixed; **ROSAMOND** (Watkins & Simpson) a variable stock; **SEEDLING** (Garner), a mixed stock.

FLOWERS OF CARMINE SHADES

CARMINE KING (Watkins & Simpson), colour varies; **GIANT IMPERIAL CARMINE SCARLET** (Bodger Seeds, Ltd.); **ROSY SCARLET IMPROVED** (Watkins & Simpson).

FLOWERS LILAC

Dwarf Stock-Flowered Lilac Rose (raised, introduced and sent by Messrs. Ferry-Morse Seed Co., San Francisco, California, U.S.A.). **A.M.** July 3, 1947.—Plants 2½ feet tall, of very compact, erect habit. Flowers 1½ inch diameter, Fuchsine Pink (between H.C.C. 627/1 and 627/2). A true and very even stock.

FLOWERS OF LIGHT BLUE SHADES

BLUE BELL (Watkins & Simpson); **SUPER MAJESTIC LIGHT BLUE** (Ferry-Morse Seed Co.).

FLOWERS OF LIGHT VIOLET-BLUE SHADES

Super Majestic Lavender (raised, introduced and sent by Messrs. Ferry-Morse Seed Co., San Francisco, California, U.S.A.). **H.C.** July 3, 1947. Plants 4½ feet tall, of erect, upright branching habit. Flowers 1½ inch diameter, Imperial Purple (H.C.C. 33/1) outer petals Bishop's Violet (H.C.C. 34/1). Stock true.

SAPPHIRE (Wm. Macdonald Seed Co.), stock mixed; **PARMA VIOLET** (Watkins & Simpson), contained pink and white rogues.

FLOWERS OF DARK VIOLET SHADES

Dwarf Stock-Flowered Dark Blue (raised, introduced and sent by Messrs. Ferry-Morse Seed Co., San Francisco, California, U.S.A.). **H.C.** July 3, 1947. Plants 2½ feet tall, of very compact, erect habit. Flowers 1½ inch diameter, Spectrum Violet (H.C.C. 735/1) with a velvety hue, outer petals Victoria Violet (H.C.C. 738/1). A true and very even stock.

BLUE SPIRE (Watkins & Simpson), stock mixed.

CELERY AT WISLEY, 1947

Nineteen stocks of Celery were sent for trial in 1947. The seed was given the Formalin treatment, before sowing, against the Celery Leaf Spot (*Septoria Aptii*). This consists of totally immersing the seed for three hours, in a solution of Formalin, 1 in 300; this, while not controlling the disease entirely, greatly lessens the amount of infection. A small outbreak of Celery Leaf Spot occurred on two varieties, but this was effectively checked by two applications—on September 25 and October 6—of a colloidal copper spray. No attack of the Celery Fly was apparent.

The seed was sown under glass on March 31, and picked off when large enough to handle, and planted out on June 16 in single-row trenches. The plants grew well, with the aid of overhead irrigation, in spite of the dry summer.

The trials were inspected by a sub-committee of the Fruit and Vegetable Committee, who made their recommendations for Awards on November 27, 1947, as given below.

WHITE VARIETIES

Both inner and outer leaf-stalks white

Clandon White (raised, introduced and sent by Messrs. Watkins & Simpson, Ltd., 27 Drury Lane, Covent Garden, London, W.C. 2). **A.M.** November 27, 1947.—Height 26 inches, 4½ to 5 inches thick, compact, leaf stalks thick, broad, 14 inches long, very solid; flavour good. Stands well and blanches well. A very true and regular stock.

Special Market White (raised by Mr. A. A. Clucas, introduced and sent by Messrs. J. L. Clucas, Ltd., Ormskirk, Lancs.). **A.M.** November 27, 1947. Height 26 inches, 4 to 5 inches thick, compact; leaf-stalks thick, broad, 12 inches long, very solid; flavour good. Stands and blanches well. A true and level stock.

Monarch White (introduced and sent by Messrs. J. L. Clucas, Ltd., Ormskirk, Lancs.). **A.M.** November 27, 1947.—Height 30 inches, 4½ to 5 inches thick, tallest variety in the trials; blanches less easily than the other varieties; leaf-stalks fairly thick, 18 to 22 inches long, solid; flavour good. Stands well. A true and very good level stock.

Bibby's Defiance White (introduced and sent by Messrs. Watkins & Simpson, Ltd., 27 Drury Lane, Covent Garden, London, W.C. 2). **H.C.** November 27, 1947. Height 28 inches, 3 to 3½ inches thick; leaf-stalks 18 inches long, of medium width, fairly solid; flavour good. Stood well. A good and true stock.

White Perfection (raised, introduced and sent by Messrs. Watkins & Simpson, Ltd., 27 Drury Lane, Covent Garden, London, W.C. 2). **H.C.** November 27, 1947. Height 24 inches, 3 to 4 inches thick; leaf-stalks thick, 14 to 16 inches long, broad, solid; flavour good. Stands well. True and a good stock.

The following varieties were included: BRYDON'S PRIZE WHITE (Nutting & Sons, Ltd.); IDEAL (Laing & Mather, Ltd.); IVORY WHITE (J. L. Clucas, Ltd.); SOLID WHITE (Sutton & Sons, Ltd.); WAREING'S DWARF WHITE (J. L. Clucas, Ltd.); WHITE GEM (Sutton & Sons, Ltd.), dwarf habit.

PINK VARIETIES

Clayworth Prize Pink (sent by Messrs. Nutting & Sons, Ltd., Warwick Wold, Merstham, Surrey). **A.M.** November 27, 1947.—Height 26 to 28 inches, 4 to 5 inches thick; leaf-stalks 17 inches long, thick, dark pink at their base, solid and brittle; flavour very good. Stood well. A very good even stock.

Clayworth Prize Pink (sent by Messrs. Watkins & Simpson, Ltd., 27 Drury Lane, Covent Garden, London, W.C. 2). **H.C.** November 27, 1947.—Height 26 inches, 4 inches wide; leaf-stalks 14 inches long, thick, dark pink at their base, solid and brittle; flavour very good. Stood well; a good even stock.

The following varieties were included: PRIZE PINK (J. L. Clucas, Ltd.); SUPERB PINK (Sutton & Sons, Ltd.); WINTER PINK (J. L. Clucas, Ltd.).

RED VARIETIES

Standard Bearer, Red (sent by Messrs. Watkins & Simpson, Ltd., 27 Drury Lane, Covent Garden, London, W.C. 2). **A.M.** November 27, 1947.—Height 28 inches, 3½ to 4½ inches thick; leaf-stalks deep red, thick, 16 inches long, brittle, solid; flavour excellent. Stands well. A very good deep coloured, regular stock.

The following variety was included: BRYDON'S PRIZE RED (Nutting & Sons, Ltd.)

BOOK NOTES

"Wild Flowers of the Chalk. By John Gilmour. (King Penguin Books.) 29 pp. 16 col. Illus. 2/6.

This little book should be in the hands of every plant lover. When one has read it one wants to go straight out on to the Downs and see these delightful plants and recount to oneself all the stories about them that make this book so attractive. Was it not Linnaeus who said how much more amusing it is to walk in the country when one knows the names and histories of the plants one meets?

This book which is all too short will encourage those who like to wander on the chalky lands to appreciate their walk to the full. Even when the niblick is caught in the Rest-harrow, it may console the golfer to reflect that the oxen with the plough once also had a tough time of it. And who, after reading this book, will ever forget "the land-ladies who are constant but not exclusive" and how they come to illustrate the characteristic flora of the chalk?

Mr. Gilmour is to be congratulated on a book full of learning and delightfully written, which leaves the reader eager for more.

Irene Hawkins has drawn some charming plates to illustrate the book.

F. C. STERN.

"Roadside Trees in Town and Country." By Maurice Fitzpatrick. (Irish Roadside Tree Association, 19 Dawson Street, Dublin.) Price 2s. 6d.

This small booklet contains practical suggestions for the planting of roadside trees in Ireland together with some attractive photographs. The majority of the suggestions are equally suitable for planting in England, especially in the south and west. It is to be regretted, however, that recommendations are not included for such unusually fine species as *Magnolia Campbelli*, which grow well in the milder climates and need a long-term programme of care such as can well be provided by a public body. Another omission is *Prunus Sargentii*, probably the most suitable of all flowering Cherries by reason of its pyramidal habit of growth, its early and abundant flowering and its fine autumn colour, while many of the *Crataegus* genus as well as the common Hawthorn make excellent roadside trees. However, the booklet should certainly be helpful to all rural and borough authorities responsible for roadside tree planting.

P. M. SYNGE

"Early-Flowering Chrysanthemums for Exhibition." By H. G. Park. 72 pp. with illustrations. 2nd edition. (Warden & Co. Ltd. Hendon, N.W. 4.) 5/- net.

The growing of early-flowering Chrysanthemums for exhibition as distinct from garden decoration has for many years been a cult with numbers of enthusiastic amateur growers. This book does not set out to be a complete guide to early-flowering Chrysanthemums in general but deals exclusively with growing for exhibition. The author gives details of methods which he has successfully followed over a long period in the culture of exhibition blooms of the highest quality. The matter is presented in such a way that the amateur grower with only an elementary acquaintance with the subject should be able to follow the recommended procedure with little or no difficulty, the instructions being the essence of clarity. The book is written in colloquial fashion. The author deals first with propagation and all that this entails, going on to the preparation of the site, planting out, feeding, and the many other details of cultivation necessary for the production of high quality flowers. Different varieties are considered, with stopping and timing notes thereon. Hints on the actual exhibiting of the blooms are given, together with some useful notes on the reading and interpretation of schedules. Hand-drawn illustrations are provided throughout the book emphasising various points dealt with. Particularly useful are those relating to stopping and disbudding.

"Late-Flowering Chrysanthemums for Exhibition." By H. G. Park. 72 pp. with illustrations. (Warden & Co. Ltd., Hendon, N.W. 4.) 5/- net.

The author has followed up his handy little book on early-flowering Chrysanthemums with another on late-flowering Chrysanthemums. This gives details of cultivation—based on his own experience—to be followed for the satisfactory production of exhibition blooms. The subject is adequately covered from the work of propagation, potting up, securing of buds, housing and finishing to the actual selection and setting up of the flowers at the show. Each phase of work is described in considerable detail. Manures and manuring are discussed with recommended methods of procedure; and there is a chapter on control of diseases and pests. The important business of stopping and timing is explained in detail, the author taking the reader through the intricacies of the subject with confidence born of experience. Recommended dates for stopping and the buds to secure are given for a great many individual varieties. Throughout the book the importance of thoroughness in all details of cultivation is apparent and Mr. Park takes pains to impress the need for this in the advice he gives. The hand-drawn illustrations are useful and assist in making clear difficult points.

HOWARD H. CRANE

JOURNAL OF THE ROYAL HORTICULTURAL SOCIETY

Vol. LXXIII

Part 4

April 1948

THE SECRETARY'S PAGE

Programme of Meetings.—The following Meetings and Shows will take place during April and May:—

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| { Tuesday, April 6—12 noon to 6 P.M. | |
| { Wednesday, April 7—10 A.M. to 5 P.M. | |
| { Tuesday, April 13—12.30 P.M. to 6 P.M. | } Daffodils only |
| { Wednesday, April 14—10 A.M. to 5 P.M. | |
| { Tuesday, April 20—12 noon to 6 P.M. | |
| { Wednesday, April 21—10 A.M. to 5 P.M. | |
| { Tuesday, May 4—12 noon to 6 P.M. | |
| { Wednesday, May 5—10 A.M. to 5 P.M. | |
| { Wednesday, May 26 | } CHELSEA SHOW |
| { Thursday, May 27 | |
| { Friday, May 28 | |

Daffodil Competition and Show.—At the Show on April 6 and 7, there will be a Daffodil Competition intended primarily for, but not restricted to, West Country growers. The annual Daffodil Show will be held on April 13 and 14. Schedules may be obtained on application to the Secretary.

Rhododendron Competition.—The Annual Rhododendron Competition will be held in conjunction with the Show on May 4 and 5. The schedule may be obtained from the Secretary.

Sewell Medal Competition for Alpines.—A Sewell Medal for an exhibit of Alpines staged by an amateur is offered for award at the first Fortnightly Show in April. Particulars are given in the schedule which may be obtained from the Secretary.

Kindred Societies' Shows.—The Alpine Garden Society are holding a Show on Tuesday and Wednesday May 4 and 5 in the Old Hall simultaneously with the Society's Fortnightly Show. Fellows' and Associates' tickets will admit to this Show.

The Midland Daffodil Society's Jubilee Exhibition.—The Midland Daffodil Society will be holding its Jubilee Exhibition in the

Conference Hall, Stratford-upon-Avon, on Tuesday and Wednesday, April 20 and 21.

Lectures.—The following lectures have been arranged:—

April 6—"Growing Daffodils in a Town Garden," by MR. N. F. LOCK, F.R.C.S.

April 20—"Some notable plants in Cornish Gardens," by THE BISHOP OF TRURO.

May 4—"Hardy Evergreen Azaleas in the Garden," by MR. J. P. C. RUSSELL.

Wisley Gardens.—For the convenience of Fellows visiting London for the Chelsea Show, it has been arranged that on Sunday, May 23, and Sunday, May 30, the Society's Gardens at Wisley will be open at 1 P.M. instead of 2 P.M. which is the normal Sunday opening time. The Gardens will be closed at 6 P.M. on each Sunday as usual.

Garden Advisory Service.—Owing to the large number of Fellows making applications for the services of the Society's Garden Adviser late in 1947, it was, unfortunately, impossible to deal with all requests. Any Fellow who requires this service this year is advised to make an early application, stating the time of the year he would like a visit from the Garden Adviser. The receipt of early applications will enable us to spread out the work of the Garden Adviser throughout the year, and we hope to avoid disappointing Fellows. If a Fellow intends to re-arrange his garden with consequent re-planting, the spring or summer is the most convenient period for a survey to be made. Time will then be available for the necessary work on the garden to be put in hand before winter. There is a further advantage that it will be possible to place orders with nurserymen at an early date for new stock, which may be in short supply.

Application for the services of the Garden Adviser should be made to The Secretary, The Royal Horticultural Society, Vincent Square, Westminster, London, S.W. 1.

The Society's Examinations.—The written part of the examination for the National Diploma in Horticulture (Preliminary and Final) will take place on Saturday, April 10. Candidates for the examination for Teachers of School Gardening are reminded that the closing date for entry is Friday, April 30, 1948.

The Horticultural Club.—A meeting of the club will be held on Tuesday, April 20. Dinner will be served in the Restaurant in the New Hall at 7 P.M. and after dinner MR. W. B. CRANFIELD, V.M.H., will give a talk on Ferns. It is intended also that there should be a short discussion and introductory talk on notable plants in the Show, which will be given at 6 P.M. in the club room on the second floor of the New Hall. For further particulars of membership of the Horticultural Club, application should be made to MR. J. R. PULHAM, 71 Newman Street, W.1.

Publications

Journal, Ten-Year Index and List of Awards.—The Index to the JOURNAL from 1936 to 1945 has been prepared by MR. F. J. CHITTENDEN, V.M.H., and is now published in a cloth bound volume, price £1, postage 6d. The arrangement is the same as the previous Index, 1838 to 1935 published in 1937.

Botanical Magazine.—It is anticipated that the first part of the

New Series this will be available early in April. Prospectuses are also available and have been dispatched to those who had already applied for them. The plates for the Magazine are printed in four colour half-tone. The price of the Magazine is £4 per annum or one guinea per part post free. Subscriptions and orders should be sent direct to The Secretary, The Royal Horticultural Society, Vincent Square, S.W.1.

The Rhododendron Year Book, 1947, price 8s. 6d., postage 6d. and **The Guide to Wisley Gardens**, price 1s., postage 3d. are also available now.

Horticultural Colour Chart (Vols. I and II).—*The Horticultural Colour Chart* is now available, again from this office, price £2 10s. a copy plus 1s. for postage and packing for inland orders, 2s. for overseas orders.

Fuchsias: Mr. W. P. Wood's article in the JOURNAL for Nov. 1947 has been reprinted and is available as a pamphlet, price 1s., post free.

WISLEY IN APRIL

THIS month will show a greatly increased number of flowers in all parts of the Gardens, and the warmer weather will make a visit to Wisley more enjoyable than during the winter. Flowering shrubs are daily increasing in number and the unfolding buds and often hanging catkin-like flowers of many of our deciduous trees are also of interest, especially when associated with the coloured bark of such trees as Willows, Birches and Maples.

Near the entrance the borders of Polyanthus are flowering gaily below the dry stone wall hung with clouds of yellow blossoms from the old-established plants of *Alyssum saxatile*. Towards the end of this month the first Wallflowers will be in flower in the new formal beds at the top of the steps, a display which should be outstanding in May when Tulips and Wallflowers will be in full bloom. Along the broad vista leading to Battleston Hill the Dahlia beds have been prepared for planting and the Delphiniums are growing strongly, while beyond these the Daffodil Trial is in full flower; many varieties are included, both older standard kinds and newer forms, some of which were only selected for trial last year.

On the hill-side the Kurume Azalea carpet is breaking into new growth but few flowers can be expected the first year after planting. The brow of the hill is planted with a collection of Rhododendron species and several of these are already in bloom including the primrose yellow *R. caloxanthum* and *R. litiense*, the lax pink trusses of *R. Fargesii*, and *R. Stewartianum*, with rose or cream blossoms. Many of the smaller kinds have been producing a few precocious blooms for several months, but now that their real season of blossoming is at hand, they greatly increase their efforts, particularly the lavender-blue *R. hippophaeoides*, *R. saluenense* (bright purple), *R. russatum* with many vivid violet clusters, and the small pink heads of *R. cephalanthum* var. *crebreflorum*; *R. racemosum*, with pink blossoms both in the axils of the leaves and in a terminal cluster, is also planted here and in other parts of the Gardens.

Over the bridge many other Rhododendrons, including some of the

more recent hybrids, are also in flower, with *Pieris taiwanensis*, several Magnolias, varieties of *Camellia japonica*, and *Camellia cuspidata*. A further point of interest is the newly completed bridge and the many new pathways constructed through the banks of established Rhododendrons on the north-eastern side of the hill. These paths connect with the first section of a new walk which is to be continued round the base of the hill to the recently planted selection of ornamental Cherries in the field near the Portsmouth Road.

On the grassy slope containing the long Rose borders many of the flowering Cherries will be opening their first blooms this month, beginning with the free-flowering *Prunus yedoensis* and the pink *P. Sargentii*, soon to be followed by *P. serrulata* var. *semperflorens* and the well-known double-flowered Japanese Cherries, including the fastigate variety 'Amanogawa,' a very useful tree for planting in confined areas. With the Cherries is planted a selection of flowering Crabs, many with coloured foliage and deep pink flowers, which continue the display until well into May.

Continuing up the slope to the Alpine Nursery we find many bulbous flowers are opening rapidly in the spring sunshine, while the brilliant colours of the trial of *Tulipa Kaufmanniana* and *Kaufmanniana* × *Greigi* hybrids are outstanding, particularly the shades of scarlet and orange which are probably unequalled by any other member of this large genus.

The Alpine House now contains many pans of flowering plants, including a number of Lewisias, amongst them the lowly *L. pygmaea* and *L. brachycalyx*, the charming rose-tinted *L. Howellii* and the larger apricot-coloured *L. Tweedyi*, in contrast with the intense violet of *Wahlenbergia serpyllifolia* var. *major*. Another very interesting section contains the Ericaceous Phyllodoces and Cassiopes, with neat deep green foliage and white or pink flowers, including *Phyllodoce coerulea* with bluish-purple terminal clusters, and the neat *Cassiope rigida* with beautifully-formed white flowers on threadlike stalks.

The Rock Garden is now fully awakened, and fresh growth and newly opened flowers are to be seen on every side. Near the upper path *Prunus subhirtella* var. *pendula*, surrounded by *Rhododendron racemosum*, never fails to provide a charming group in contrasting shades of pink, a colour also seen in *Aethionema pulchellum* and the valuable *A.* 'Warley Rose.' Aubretia, Phlox and Viola are indispensable at this season and many varieties will be found in flower, while on shaded rock faces the lavender flowers of *Ramonda Nathaliae* and the related *Haberlea Ferdinandi-Coburgi* rise on red stems from the centre of dark green rosettes. Spreading over the flat rocks to form low cushions of green stems now smothered in cream flowers is *Cytisus kewensis*, an easily grown hybrid Broom; other shrubs planted on the lower slopes include the sweetly scented, white-flowered *Osmanthus Delavayi*, rivalled in perfume by *Viburnum Burkwoodii*, a near neighbour, and the honey-scented *Erica mediterranea*.

Round the bog garden, where the golden fleshy spathes of *Lysichitum americanum* are appearing from leafless rootstocks, will be found many dwarf Rhododendrons with mauve, primrose, or pink flowers, vivid

clumps of *Primula rosea*, the tall rosy heads of *Saxifraga peltata* on leafless stems, and the double and single forms of our native Kingcup.

The Wild Garden is carpeted with Erythroniums, Scillas, Chionodoxas, and Wood Anemones, while Magnolias, Rhododendrons and Pieris are also in full flower. The large bushes of *Camellia japonica* varieties are an outstanding feature at this season, while the extensive plantings of Primulas made last summer are now commencing to bloom, with the mauve heads of *Primula denticulata* heralding the greater display of "Candelabras" soon to follow.

Passing into Seven Acres we see near the pond, the large specimen of *Salix vitellina pendula* covered with yellow-green leaves over its yellow stems, while the Heath Garden is ablaze with *Erica carnea* varieties, *E. mediterranea* and large bushes of the white-flowered *E. arborea alpina*, the hardiest of the Tree Heaths. In the borders the numerous Barberries are carrying hanging sprays of yellow or orange flowers, Forsythias are a mass of yellow bells, and the many Cherries are opening their pink or white blossoms, often enhanced by the bronze tints of the unfolding leaves; the creamy yellow 'Ukon' is an outstanding variety in this respect.

If the weather is kind, a walk through the Pinetum to Howard's Field is well worth while. Keeping along the side of the river, we emerge near the Rose species where *Rosa Hugonis* and *R. Primula* are opening their pale yellow blossoms; on the centre walk several of the dwarf *Prunus* species are in flower, the Russian Almond *Prunus tenella*, *P. glandulosa*, with double white flowers, and *P. japonica* var. *Nakaii*. The Cydonias mentioned last month are still in flower, while the first Lilacs will be opening their blossoms during April. Returning through the centre of the Pinetum, gay with many hybrid Flowering Crabs during the latter part of the month, we turn out of Seven Acres into the long borders beneath the old Apple trees. One bed is filled with a collection of Violas, in blue, white, yellow and purple, and another contains a trial of Polyanthus, one of our most valuable spring bedding plants. These strains should show many outstanding forms both in colour and flower-size.

The Award of Garden Merit Collection contains a fine specimen of *Magnolia Soulangeana*, now a slow-growing small tree whose freedom of flowering increases with age; in the side borders are several large trees of *Prunus subhirtella* and *P. yedoensis*, while near the end of the collection a large mound is covered with *Berberis stenophylla*. Other interesting shrubs planted here include the free-flowering white *Spiraea arguta*, a large *Forsythia intermedia* var. *spectabilis* and a well-developed specimen of *Erica arborea alpina*.

In the Greenhouses great activity is now in evidence, particularly in the propagating houses where many seedlings are being pricked out and potted off before being placed in cooler quarters.

The Temperate House still contains many plants in flower, including the sweetly-scented *Buddleia asiatica*, *Clivia miniata* with heads of glowing orange flowers, the climbing Hibbertias with golden-yellow blossoms, and many pots of Primulas, Lachenalias, Ericas and Epacris on the side staging.

MAGNOLIA FLOWERS FOR 1948

Lord Aberconway, C.B.E., V.M.H.

THE flowering of Magnolias varies somewhat from year to year, and it is interesting to see the flower buds before the leaves develop.

This year in my garden *Magnolia stellata* and *M. kobus* (the ordinary form) have their usual lavish abundance of flower buds. *M. kobus* var. *borealis*, however, although now a large tree twenty years of age and 40 feet high, refuses to produce a single flower bud.

M. salicifolia is also full of buds, although its standard of numbers is perhaps one-half to two-thirds of that of *M. stellata* and *M. kobus*; it makes up for the smaller number of flowers by their extreme whiteness, and the fact that there is never a green shoot to interfere with their beauty. In the case of *M. kobus*, the leaves begin to appear before the flowers are quite over.

M. Sprengeri, both the variety *elongata* and a seedling from *M. S. diva*, have quite their usual quantity of buds. Indeed, the latter plant has never flowered with me more freely, but of course one does not expect the same abundance of flower as on *M. kobus*, as the flowers are so much larger.

M. conspicua and its hybrid *M. Veitchii* are also as full of bud as usual.

When, however, one comes to that other most interesting group—*M. Campbellii*, *M. Sargentiana*, *M. (Sargentiana) robusta* and *M. Dawsoniana*, the tale is very different. These all were fully budded a year ago. The flowers of *M. Campbellii* were, however, frozen in the bud. Those on *M. robusta* developed to an outstanding beauty. Cones were, however, formed, which fell off before they matured and growth was short, and hardly any flower buds show this year.

M. Sargentiana itself had a sprinkling of flowers last year, but has no buds this year, while *M. Dawsoniana* had rather more buds last year, but again none this year. *M. Campbellii* has only two buds.

There seems no deficiency in flower on the *M. parviflora* section, while *M. hypoleuca* (or *M. officinalis*) has a good number of buds to come when the leaves are out.

As this note deals with Magnolias from a garden point of view, I use their well-known horticultural names and not the botanical ones.

THE MODERN SWEET PEA

E. R. Janes

IT is not the purpose of this article to deal with Sweet Pea history—a matter handled very ably by others—but for comparison and illustration some reference must be made to varieties which formed the first valuable nucleus and led to the gradual build-up and development of the modern Sweet Pea.

Although sent here by CUPANI in 1699, the Sweet Pea showed few of its possibilities until sixty odd years ago, when many fresh forms and colours began to appear. Even then, from the florist's point of view, it was regarded as an accommodating, free-growing annual and its decorative qualities as a cut flower were valued in much the same way as other annuals from the border.

From the meagre records available, it appears that until about this date little advance had been made in size or length of stem, and in some varieties the hooded habit of wings and standard, which according to old drawings shrouded the keel and gave a wrapped-over effect, spoilt much of its decorative value, and but for its delicious perfume it is doubtful if either raisers or growers would have bothered much about it.

The Sweet Pea, however, possessed an indefinite grace and charm which attracted many plant lovers, who paid a great tribute to its intrinsic qualities by persevering with a dowdy-flowered plant, a point worth noting if we also note that none of the colours we now know as Sweet Pea colours then existed, for they were mainly dull carmine-pinks, drabbish mauves and purples, with various bicolour pinks and purples similar in shade to those which appear occasionally as type rogues to-day, relieved by so-called scarlets, and one or two white varieties.

There is little evidence of its value in the market as a cut flower except that, from various accounts, mixed Sweet Peas in bunches had been sent to Covent Garden for a century or more previous to 1880, but between that date and 1890 some enterprising growers commenced to send small quantities, bunched in separate colours—white, rose-pink, carmine, mauve and purple—and in 1890 we find the rose-pink 'Princess Beatrice' described as the "pink variety seen in Covent Garden" in a noted seedsman's catalogue, and from this period development was rapid, as is so often the case when a species breaks into varieties under cultivation. These new varieties were not far away from the existing ones in shade and the first great improvement occurred in white varieties, several of which appeared about 1897 or a little before. The best of these was probably 'Emily Henderson,' as the popular 'Blanch Burpee,' which was in general culture about the same time, although slightly larger was partially hooded. Between 1895 and 1900 great improvements were introduced by several raisers, ECKFORD playing the leading part, although LAXTON was not far behind. BURPEE in America was also distributing many good and distinct varieties.

By this time not only had size and length of stem been improved but the colours covered a wide range including many good salmon, orange and orange-scarlet shades, but although very beautiful, there

was little improvement in form. Most of the introductions of this period were known as Giant or Grandiflora varieties. At this time the Sweet Pea, excited by cross fertilization, sometimes deliberate and well planned but often haphazard, was now ripe for a sensational big break. It came in more than one place, for when COLE showed blooms of his waved variety at the Sweet Pea Conference of 1899 at the Crystal Palace, UNWIN also showed 'Gladys Unwin,' which, if not quite identical, was very near it. Both were clear pink on a white ground but instead of straight backed, hooded or reflexed standards, each had standards beautifully crimped or waved. Nature had rewarded Sweet Pea lovers by providing varieties whose standards were so voluminous that it was necessary to fold them in pleats or frills to hold the extra material in position. The wings too had taken new shape, for they were longer and stiffer and did not hood or obscure.

COLE's variety was known as 'Countess Spencer' and UNWIN's as 'Gladys Unwin.' These varieties, although so closely alike, did not give the same results when crossed out and it was from 'Countess Spencer,' which in the opinion of many was slightly larger and more wavy, that all of our modern Sweet Peas were derived. The progeny of 'Gladys Unwin' crosses formed the nucleus of a small family once known as 'Gladys Unwin' varieties which, although waved, had fewer folds in their standards than their more beflounced rivals, the "Spencer" varieties.

It is noticeable that just as the advent of the good white varieties led to the arrival of great improvements in the Giant or Grandiflora varieties, so the coming of the first wavy white, 'Etta Dyke,' had great bearing on the varieties which came in a never ceasing flow from a large number of raisers from 1900 until the first World War in 1914 and for a season or two afterwards. Almost all the colours known in the Grandiflora varieties then became available in the more beautiful "Spencers." At first seedsmen indicated in their catalogues those which were "Spencers," but in a very few years the indication marks were unnecessary, because all were "Spencers," a mixture of Grandifloras or a few of the best varieties being relegated to the bottom of the page in small type. To-day it is doubtful if any of these old heavily-scented forerunners could be obtained in this country.

In the early years of the "Spencers" various white forms known as 'White Spencer' appeared. These were white seeded and very similar to 'Etta Dyke.' No great advance in white varieties took place for some years—if we except an American variety, 'King White,' which did not last long—but in the same period a much larger, bolder white, with heavy, opaque standards and wings, 'Constance Hinton,' was distributed. This was black seeded, and in the opinion of many was not true white because although at first it gave pure white blooms, as the plant became older, or if over-fed, the blooms became slightly suffused with pink. For all practical purposes, however, it was a white variety and so much superior to any other that it is not surprising that this and various similar black-seeded whites were not dispossessed until BOLTON introduced 'Gigantic' in 1934. This, though undoubtedly finer than any white before it, had its defects. Certainly it was larger than any white

before, but it was slightly variable in form and was liable to throw a few pale pink forms, a defect afterwards amply made good by the raiser. Among other good whites, 'Mount Everest,' introduced by SUTTON's in 1939, is also an outstanding variety of large size and of substance more than usually opaque. Both 'Gigantic' and 'Mount Everest' are still among the largest modern varieties and nowadays little is heard of the prejudice against black-seeded whites.

Light Blue has always been a difficult colour and of all the blue varieties introduced from the coming of the "Spencers" 'Mrs. Tom Jones' was the first to impress. Afterwards, 'Blue Shadows,' 'Blue Bell' (Fig. 28), 'Delphinium' and others proved great improvements, and 'Mabel Gower,' introduced in 1946, certainly marks another step forward. It must be said, however, that all these blues have much red in their make-up and there is still plenty of scope for the Sweet Pea raiser, as a blue which even approaches gentian colour is still far away.

In the cream ground 'Salmon Pink' section, many advances have been made, for from the time the first cream ground "Spencer" variety was obtained 'Salmon Queen,' 'Mrs. Rootzahn Spencer,' 'Audrey Crier,' 'Doris Usher,' 'La France,' 'Picture,' 'Magnet,' 'Nobility'—to mention only a few—all made their mark and probably assisted future development. Such varieties, however, as 'Leader,' introduced in 1938, and 'Quebec' in 1940, are notable advances in size, beauty and shade of colour.

Mid-blue and deep-blue varieties have proved unsatisfactory and it is doubtful if we have any blue shades in this section of the elegant "Spencers" as good as the old Grandifloras. It must be remembered that these colours have been out of fashion for many years and it is difficult to say how much raisers have been influenced by this. Would they have produced a good variety in this section had the demand existed? Who knows?

Purples and maroons—equally out of fashion now—have had many outstanding varieties to recommend them, many of great charm and beauty. Commencing from the early days of the "Spencers," 'Othello Spencer,' 'King Manoel,' 'Warrior,' can be called outstanding examples. 'Black Diamond,' introduced a little later, is said to be the best of all maroons, having exquisite form, a beauty entirely its own, and a silky sheen unequalled by any variety. In addition, during the past twenty years several other good maroons have been raised almost unnoticed. No doubt they will return to favour some day.

Although in the same period some very fine varieties in purple shades have been introduced, which were popular at the time, they have become much less popular since. Probably the best of these are 'Purple Monarch' and 'Olympia,' which are much alike and have many good points and much beauty. When fashion swings again we may yet see a revival of popularity for these colours.

The deep mauve shades too have declined in popularity, yet we have had, and still have, very fine varieties, and in between the wide gap of the Grandiflora varieties, 'Captivation' and 'Dorothy Tennant' of 1899, and such good waved varieties as 'Chieftain' and 'King Mauve'

of to-day, many good varieties were interspersed which proved helpful in the gradual evolution.

Striking advances have been made in those varieties in which blended pink and orange shades defy accurate description and of which there were no counterparts in the days of the Grandifloras. Development of these began about the time an American variety known as 'The Fawn' was introduced and has gone on more or less steadily ever since. BOLTON has introduced many, of which 'Silver Jubilee' is a fine example—'Ethereal' and 'Queen Mary' of CARTER's approach the same colour group—and now 'Cynthia Davis,' a Sweet Pea of incomparable beauty, may easily eclipse all others in this group of beautiful elusive shades (Fig. 29).

Fascinating too are the three varieties 'Patricia Unwin,' 'Melody' and 'Greta,' which while much alike are all quite distinctly different. While making some approach to the class above they are so different that they form a class of their own. It is true that in general tone all three approach the cream-pink varieties, with which they are sometimes classed, but the beautiful buff undercurrent which gives such depth to charming shades takes them away from any other class.

The so-called lavender shades—in reality pale mauve—have gone forward rapidly. Many will remember 'Lady Hamilton,' the dainty Grandiflora Lavender, and "Spencer" varieties such as 'Lavender George Herbert,' which followed closely after. The very good varieties which reigned in turn, almost unchallenged for a long period, 'R. F. Felton' and 'Powerscourt,' are now led by 'Mrs. C. Kay,' a variety much like 'Powerscourt' but incomparably finer and of purer shade. In a slightly deeper shade 'Mrs. Butchart' is gradually displacing 'Ambition.' On the other hand, pale lavenders which are much nearer real lavender in colour, have languished a little. These are often classed as pale blues. Perhaps 'W. P. Wright' was the best early "Spencer" of this shade, but of the many, 'Gleneagles' and 'Capri'—admirable shades for subduing the louder colours—remain with us, a little in the shade of popularity.

In the early days of the "Spencers," when raisers were groping for colours, scarlets were very difficult. If they were sunproof they generally had small dark foliage and showed much bluish-crimson, or if with light foliage they gave glimpses of the wished for colour, only to lose it in sunshine, consequently the attractiveness of a row of Sweet Peas behind border or bed was often marred by a tall erection supporting tiffany shading to protect the blooms from being scorched to drabness. We are more fortunate now, for the beautiful, but not sunproof, 'Edward Cowdy,' which may be cited as a typical forerunner, has given place to such fine sunproof varieties as 'Startler,' 'Dazzler,' 'Duchess of Gloucester,' 'Home Guard,' and 'Magnificence,' which followed the good varieties raised by MALCOLM in Scotland. 'Welcome,' a distinct and somewhat richer sunproof scarlet, is also excellent.

Much the same could be said of the orange-scarlet section (scarlet predominating). The first really good "Spencer" in this section, 'Thomas Stevenson,' has given place to 'Thriller' and 'Countess Baldwin.' The latter, although more sunproof than the former, nevertheless needs light shading and much work remains for raisers here.

There is also another section of orange-scarlet (orange predominating) which so far has remained obdurate, for no member is immune from scorching. Some are exquisite shades when massed in bowls or vases although the blooms are smaller than most modern Sweet Peas. However, the disfigurement of our gardens and the physical task of shading are great obstacles to their culture, for who has the labour or material for this purpose nowadays? Until raisers can produce sun-proof varieties this section must perforce remain in the background.

Crimson varieties, like the crimson curtains of our forefathers, have almost disappeared. The Grandiflora crimsons of the early "Spencers" were all blue-crimsons, as dull, heavy and uninspiring as crimson plush, of doubtful complexion in sunshine, and easily marked by rain. Little could be said for them, but varieties like 'Mahogany'—in reality a Chestnut-crimson—are delightful in any collection and when again we use crimson material in our rooms—coupons permitting—these shades might easily become popular. At the moment lighter colours in flowers appear to keep time with lighter clothes and lighter room draperies, but one cannot say for how long!

Since the days of the Grandifloras we have always had a few examples of varieties with Picotee edges, marked much the same as Picotee Carnations. There have been several good varieties, much alike, with white or cream grounds, but with nothing remarkable about them. But now we have 'Reconnaissance,' a variety incomparably finer than any of those preceding. As it is slightly flushed as well as pencilled around the edges of wings and standards, it is almost out of the Picotee class, but in view of its warmth of tone and general beauty this is easily forgiven. There is, however, room for more varieties of Picotee whose pencilled edges remain fixed instead of wandering all over wings and petals as the season advances.

The shades of cream now existing are much the same as in the early days of the "Spencers" and it cannot be said that the best varieties of to-day are much deeper in shade than 'Clara Curtis' of those days. They are, however, incomparably finer, larger and more interesting in form, 'Cream Gigantic' being notably so. 'Cream Frills' promises to be good, and although a deep seedling of SUTTON's in the trials of 1946 showed a glimpse of what the future may hold, the yellow Sweet Pea seems nearly as far off as ever.

Flaked, bizarre and fancy varieties are now much out of fashion. Few consider them beautiful, and so many varieties belong to the ranks of those tried once and forgotten, their existence depending on the curiosity of a few fresh persons each season. It would be a pity, however, if they died out altogether. Do we want our flowers to be as stereotyped as our post-war lives? I hope not!

Also, there are few bicolours. On the whole these have little appeal. Though important in Grandiflora days, only a few waved bicolours have been popular since—'Springtime' and 'Gaiety' being our best known modern examples. We should not condemn bicolours, however, for there is nothing to prevent a really startling novelty with real decorative value from appearing. Perhaps we should welcome it. There is no reason why a bicolour should not also be beautiful.

We have had many good cerise varieties. The first good "Spencer" cerise, 'Edith Taylor,' beautiful though it was, was comparatively lifeless, but varieties such as 'Charming,' 'Scintillant' and some others, were of warmer colour, and 'Scintillant,' at its best, could be said to live up to its name. As an example of the best of good modern cerise varieties, 'Mollie' can be given. In this much of the dead appearance has been lost, and there is more than a suspicion of orange overlying the cerise base. 'Mrs. A. Searles' and 'Mavis'—both good varieties—must not be overlooked. Generally they are classed with the cherises but as there is much orange, and possibly salmon, in their colour make-up, they can be considered beautiful outsiders.

Shades of pale pink on white ground were once popular and both 'Mrs. Hardcastle Sykes' and 'Valentine' had a good innings. These shades, however, are a little too hard and cold for modern taste, the softer shades of pink overlying cream and pale buff grounds being much preferred. A really good modern variety of warmer tone would be welcome in this section. It is a somewhat difficult shade to classify and although 'Ascot,' 'Mayfair,' and 'Sextet Pink' were all good, perhaps 'Monty' is now the best example if it comes within the scope of this classification.

But what of the future? I cannot believe we have nearly approached the end of development, if indeed there is an end to the development of any species. Many years ago we were told that the Chrysanthemum was finished, yet during the past two or three decades outstanding varieties of proved value have been raised, especially in the Decorative section in which varieties of real lasting qualities, so valuable to the public, have been produced. At different times we have heard similar pronouncements about the Dahlia, the Carnation and other florist's flowers, but many of these, in spite of prediction, are now flourishing and with extensive cut flower industries built around them. For the Sweet Pea also it is safe to predict a great future. There are many signs that we are on the edge of great things—modern genetical science has advanced a long way since the days of the early "Spencers"! During the stress of war little was possible, but developments equally as startling as those of the past are more than possible. When we remember the difference between the modern Sweet Pea and those which immediately preceded the Grandifloras and Giants of ECKFORD'S and LAXTON'S days, it is not hard to visualize development proportionately great in future.

Now about size. Sweet Peas are barely large enough for decorative purposes except when grown on exhibition lines, and lots of persons are unable to grow them thus. We need Sweet Peas which, when grown naturally, are as easy to handle and as beautiful as those now grown specially for exhibition and house decoration. This is not to say that the stem should be disproportionately increased, for we have all seen long, gawky specimens at shows, useless for any purpose. Instead, nicely placed blooms proportionate in every way, with stems long enough for decorative purposes, should be the raiser's objective. Then, there is the question of vigour. It is doubtful if the Sweet Pea of to-day is as strong and healthy as that of ECKFORD'S day or as the early "Spencers."

When autumn sowing was first practised it was rare for Sweet

Peas to be destroyed during the winter, and rarer still for any to be injured by spring frost, which we assume was equally as bad occasionally as in recent years. Modern varieties subjected to severe spring frost nearly always go blind and remain permanently blind, because each successive shoot afterwards produced retains the blind habit. Yet, I can remember a very fine lot of Sweet Peas just previous to the first World War which, when in bud at the end of May, were subjected to 17 degrees of frost in the Midlands. When seen by the grower in the morning the tips of the shoots were hanging upside down, but the plants recovered, unhurt except for a little bud dropping.

Modern Sweet Peas exposed to frost of like severity invariably go blind. What is the reason? Is the Sweet Pea less hardy now, or have our modern seasons some peculiarity which we do not understand? I am, of course, ruling out any damage done by frost during the destructive season of 1946-7, as that was the winter of a century and possibly one of such intense severity and duration will not be seen again by the present generation. It was before that date that frost troubles with Sweet Peas became so marked. In beautifying, the Sweet Pea raisers should not forget the necessity for a hardy, healthy plant which everybody can manage.

What has become of the dainty Cupids? Are they lost? At one time they were sent to market. Surely, with the great demand for dwarf, decorative pot plants, suitable for hotels and the like, there is room for these beautiful little plants, which remain in flower longer than most decorative subjects? In the light of recent genetical development are they not worth serious consideration?

Looking back into the progressive development of the Sweet Pea from the plant sent from Sicily until to-day, I cannot help being struck by the similarity in its behaviour to that of *Primula sinensis*. In both cases the parent plant can no longer be found in its reputed home. Also, in both cases, in the early days the colours were mainly dull carmine-pinks, magenta-crimsons or dirty purplish-mauves. Other similarities are little progress until the coming of good white varieties, then the rapid development of many shades of rose-pink and carmine, and so-called crimsons, leading to salmon-pinks, cream ground pinks, and all the glorious delightful colours we now possess. Until the coming of 'Dazzler,' this species of *Primula* was composed mainly of colours similar to the early Sweet Peas, but with 'Dazzler' a new vista appeared and now we have colours undreamed of in *Primulas*, many of them comparable with Sweet Pea colours.

What has happened to the pastel shades of a generation ago, represented by such varieties as 'Agricola,' 'Charles Foster,' and 'After-glow'? Have they completely disappeared? Would it not be possible to resurrect these in modern forms? They had, and would have again, a place of their own.

It is well known that in hot, dry seasons and in hot, dry countries Sweet Peas soon fail. They love temperate sunshine, a moist atmosphere, and moist rooting conditions—nearly always found in Britain, but not always in our south and south-east districts. At first sight it appears remarkable that a native of Sicily should have these tendencies,

but we must remember that in the Mediterranean region germination probably coincided with the coming of rain in autumn and that growth progressed uninterruptedly through the almost frostless winter, leading to full development and a flowering period in spring, with seed shed in early summer remaining dormant on the hot soil during several months of Mediterranean heat. Our average summer is much the same as the spring of the southern Mediterranean islands.

Raisers should not forget the question of perfume. Detractors of the modern Sweet Pea say it has no perfume. This is not true. The *Grandiflora* varieties were heavily scented, and so are modern varieties, but the perfume is very different—it is cleaner, more delicate and in many ways nicer. I cannot say that I have ever grown a scentless variety. If proof is needed that perfume still exists, then a visit to the National Sweet Pea Society's Show will dispel all doubt. With the doors of the R.H.S. Hall open during preparation for the show I have smelt delicious Sweet Pea perfumes some distance away, but perfume in such a delicate flower is precious—so precious that raisers should do everything to guard it and, if possible, breed varieties in which the perfume is intensified, provided it does not become vulgar or develop into the sickly honey perfume of which our ancestors complained.

Then there is the question of disease. The Sweet Pea has few, but there is a condition known as Streak which afflicts Sweet Peas occasionally. It seems to be predisposed by changeable weather or anything which causes check or stagnation. Some believe that, like the common cold of human beings, it is a collection of different viruses which, separately or collectively, are known as Streak in a wide variation of symptoms. For this condition research has certainly been attempted, but in no very determined way, and, short of good culture and avoidance of check, no palliative or cure is known. Could not one of our scientific bodies take up this subject during the next few years? The only other disease—if it is a disease—to bother the grower is the mysterious Leaf Scorch, which apparently is in some way connected with moisture supply and respiration. It is generally worse where cold north or north-east winds prevail, but not invariably so. A remedy for this would be a great boon to the grower.

Throughout this article I have made no attempt to make a catalogue of modern varieties, but have quoted sufficient only to illustrate my points. Quite possibly I have omitted varieties which some growers consider superior and, if so, I must ask indulgence. Also, I have made no attempt to refer to very modern varieties—some of which I have barely seen—as examples. They can be dealt with a little later, when more is known about them.

Finally, many persons cannot understand why it is necessary to raise new varieties, and the opinion has often been expressed that some modern introductions closely resemble those of several years before. Sometimes this is partly true, but if the raising of novelties ceased so would progress. Neither must it be forgotten that varieties resulting from a cross—and most varieties do nowadays—have a great initial vigour which is gradually lost in time: hence, fresh varieties must be raised to replace, a matter quite apart from progress with new types and shades.

WEATHER AND PLANT DISORDERS

D. E. Green, M.Sc.

(MYCOLOGIST, R.H.S. LABORATORY, WISLEY)

*(Report of a lecture given on September 23, 1947, MR. G. W. LEAK,
V.M.H., in the Chair)*

I WOULD like just to explain the title of this lecture. For years it has been my duty to study and lecture on plant diseases of all kinds, that is to say, those diseases caused by parasitic fungi or by infection with a virus. You are familiar with that sort of disease so I thought it would be a change if I spoke to-day about some of those troubles in plants which we prefer to call disorders as apart from disease. There are a great many of these disorders and in some the cause is difficult to trace. Quite a large number arise owing to food deficiency or to some error in cultivation.

I have selected for this lecture those disorders brought about by various weather conditions but I ask you to allow me a certain amount of licence in this matter. The reason is that I have included some troubles found in greenhouses due to faulty atmospheric conditions which strictly speaking could not be called natural weather conditions. Outdoors also I have included certain troubles arising from unsuitable soil conditions caused by the effects of the weather on the soil generally.

As you know, the weather means everything to the gardener, and his study of it and anticipation of it are all important. The calendar is not so important to us as a good gardener's anticipation of the weather. But he cannot control it, so that from time to time he is threatened with damage to his crops which may vary from slight injury to irreparable damage, at any rate for that season. In some cases the ill effect may last longer and still be affecting the plant three or four seasons afterwards.

That brings me to the question of remedies. It is a fact that although we try to provide safeguards against these weather upsets and, in some cases, can prevent or at least lessen the injury to our crops, there are times when we are fairly helpless and have to accept the loss.

The climatic conditions which gardeners dislike are not easy to define because one may like what another detests owing to the variation in soil or position of the garden or the kinds of plants grown there. But for the purposes of this lecture we may at least assume that most gardeners do not like extreme cold (*i.e.*, frost) in late spring, extreme heat, extreme wetness, and the various combinations of these which we can call unsuitable seasons. But it is probably impossible to get the perfect season to suit all gardens on all types of soil. We must remember, however, that as a general rule the well-grown healthy plant is more able to withstand these weather extremes than is the overcrowded sickly type of plant.

I will describe some of these weather injuries in more detail giving the symptoms and where possible mentioning the measures (if any) which may help to reduce losses.

LOW TEMPERATURE

The first climatic condition we shall deal with is that of very low temperature or, generally speaking, frost. Severe frost may kill a plant or certain parts of it or may cripple certain tissues, but in many cases there is a remarkable effort to recover from injury. This injury of course varies according to the severity of the frost. In foliage we often get blackening and death such as occurs in Walnut leaves and shoots, but we also get crinkling and puckering in leaves which are only just unfolding. This is known as frost blistering and can be seen in Phlox and Roses, and it often persists for that season so that in summer the Rose leaves are still puckered and blistered although otherwise healthy. In other leaves, such as Maple and Horse Chestnut, the blistered parts may die and the leaf later appears lacerated and torn with many holes between the veins where the dead tissues have fallen out. In certain bedding plants, such as Antirrhinums in frames, low temperatures may result in the leaves becoming quite "silvered" in appearance but they will recover. Young Cabbages in spring may also become yellowish in colour due to chlorophyll formation being prevented when temperatures keep low for long periods, but they improve with better weather. In Lilies and Irises the stems may bend over in severe late frosts and they later may try to straighten up but do not quite succeed, so we have a crooked flower stem.

Even in woody plants we can get frost injury to shoots. The shoots of some Rhododendrons can be split by frost. The split places may heal but some very gradually turn into a canker owing to infection by a parasite, so that three or four years afterwards the branch starts dying above the canker, which has slowly girdled the branch. Lilac trees in severe winters may have their bark split away all round the stem at ground level so that later the trees die, although they burst into leaf in spring. It is well known to many of you that shrubs and even large trees may suffer from bark splitting in a severe winter. At Wisley in early 1940 we saw much of this damage, and we had large Apple trees which showed cracks in the bark of their main stems extending from just below the crutch where the branches began, down to near ground level. In successive frosts such a crack may become larger and more bark forced up and away from the wood. It can be tacked down by driving nails at intervals along the edges of ruptured bark. This may not cure the injury but will help to prevent further gaping of the crack and the dead edges can be cut away later on when healing is proceeding from inside, the cut parts being painted as a protection from disease.

Probably the kind of frost damage in which we are most interested is that affecting the flower buds, the flowers, or the young fruits of our common fruit plants. These late spring frosts are a menace to fruit setting in many districts. The damage varies according to the time of year (*i.e.*, the lateness of the frost), and the severity of the frost. The flower buds can be affected before the petals open, the open flowers may be killed or the young fruits may be damaged after they have set and indeed when they have reached a fair size. The flowers of Strawberries are often destroyed by frost in late spring and they turn black in the centre although the petals may remain white. We call this "Black Eye,"

and 'Royal Sovereign' is very susceptible, so that in gardens where this damage is probable we advise that 'Huxley' be grown. In Apples severe frost can affect the flower buds while they are still closed, *i.e.*, the green bud stage. In the open flowers the petals often turn a brownish colour, but the place to look is not at the petals but at the style or female part of the flower, because where this is blackened the flower is doomed. We may go farther and cut the base of the flower, *i.e.*, the ovary, open lengthwise when the black or brown discoloration will be seen extending into the very small ovary.

Even the small fruits of Apples, Plums, etc., can be killed or injured by late spring frosts. If the fruits are very small the injury is in the centre near the seeds, and cutting open as in the case of flowers will soon show whether the centre is discoloured black or brown. Cherries and Plums show the immature stone badly discoloured. One sometimes hears people saying that they think their 'Victorias' have escaped because they have not fallen off. It is wise to wait and see, but a quicker idea of the damage could be obtained by cutting some of the fruits open and looking for the internal blackening.

With slightly larger fruits the damage is nearer the outside (periphery), and in this case, if the small Apples are cut across, not lengthwise, there will be seen a dot-like ring of brown in the flesh just under the skin. In others, only the skin is affected and the fruits will continue to grow but the shape may be affected so that, besides a roughening or russetting of the skin, we get apples which are lopsided or have a definite constriction around them so that we call them "banded" or "waisted" fruits. In 'Bramley's' the russetting occurs particularly around the eye and it is common to see a tree of this variety with almost all its fruits showing russetting near the eye. A most peculiar frost effect in Apples is that in which the young fruit shows a tendency to split lengthwise along the dividing line of the seed carpels and this can be seen in the mature fruit as vertical grooves on the outside of the apple (Fig. 40).

Spring frosts can do great damage to vegetable crops. Asparagus is often nipped unless covered as a precaution. The stems are blackened and soon wither up, and no one has any difficulty in recognizing this state. But some stems are not blackened although they are frosted, and these are easy to miss. They are injured at ground level where there is only a slight softening and wrinkling. These are not suitable for selling or indeed using at all, but when cut are not easy to pick out.

Potatoes when frosted in store become skins full of water and are easily recognized. There is, however, a less obvious damage known as "chilling" usually caused by a long succession of low temperatures rather than by one hard frost. These chilled tubers may taste sweet but this in time may disappear again. It is in seed tubers that chilling is most dangerous because the owner is often unaware that it has occurred. When planted, the tubers grow only weak sprouts and the plants remain small and stunted even after six or eight weeks. In my opinion, many failures in Potatoes are due to chilled seed, but it is very difficult to be sure of it by the time the grower recognizes something is wrong.

Spring Cabbages are destroyed by winter cold and also by spring

frosts. The hearts in spring are destroyed by the Grey Mould fungus, *Botrytis cinerea*, but this fungus first gets a hold on the inner leaves damaged by frost. This is more likely to happen to plants stimulated into soft growth by early applications of fertilizers. Similarly with flowering plants such as Stocks which have their growing points killed by severe frost. A very good example is seen in Wallflowers which suffer from what we call Dieback or Winter Injury. Sometimes only one shoot dies, sometimes the whole plant, but beds are sometimes rendered most unsightly. The fungus *Botrytis cinerea* is seen flourishing on the affected leaves and shoots. For years this was called Botrytis dieback disease, but in the three years 1935-7, our experiments at Wisley proved that the fungus would not destroy healthy Wallflower shoots even if we innoculated them with it. We found in our trials that where shoots were injured by the weather (according to their growth, whether soft or hard, and to the date of planting out), then such injured shoots were soon invaded and destroyed by the fungus. The real, that is the primary, damage was due to the weather and depended on several factors, the fungus always being ready to attack such injured parts. Wallflowers must have enough potash when young, soft growth must not be encouraged and they must be planted out into final quarters early enough to get well established before adverse weather is likely to start.

HIGH TEMPERATURES

We must now turn to heat damage by which I mean *direct* heat. Most of this damage we refer to as "Scald," which is an appropriate name. For instance, Apple Scald occurs in seasons with high temperatures mostly on fruits exposed to the sun and shows as a discoloured patch on the skin, sometimes yellowish with a reddish outline and having a light coloured band or halo around the outer edge. Apart from the sun, we are not sure of the factors which contribute to this damage. Tomatoes show it as a creamy-white patch with a wrinkled surface. It may occur on fruits very near the glass in a greenhouse, especially if the foliage is scanty, but it can occur in quantity in fruits laid out to ripen on greenhouse staging. There is no need to expose Tomato fruits near glass to ripen off in this way. Plums may be scalded on the trees while still green—the variety 'Cox's Emperor' seems to be one of the most susceptible. The injury shows as a discoloured patch often reddish which then sinks and looks like a deep thumb mark. In South Africa this condition is well known and is considered to be due to drought and lack of nitrogen during periods of high temperatures. In this country a very well known scald is that of Grapes under glass which is attributed to hot sunshine while there is excessive moisture around the berries. The usual fault is that the ventilation is insufficient to get rid of the excess moisture.

Even Potatoes in light stony soil are sometimes affected by what we call "sunstroke" which injures the bases of the stems so that they shrink and wither up. The tops are thus inclined to fall apart, further exposing the stem bases, so that the plant soon sprawls and remains small or even dries up. In these cases the fault generally is that the soil is not

manured enough or the tubers planted early enough for the plant to make a good top quickly and shade the soil underneath it.

In very hot seasons it is unwise to dry off bulbs in the sun and they are better placed in the shade or under cover entirely. Otherwise they can be injured so that their tissues go dry and chalky. This can happen to Tulips, Shallots and bulbs of all kinds which first show a cooked or scalded appearance in their outer fleshy scales and then turn dry, white and chalky (Fig. 38). It is bad enough if the sides are injured in this way, but if the bases are affected the bulb is prevented from rooting again and is useless.

DROUGHT

We pass from direct heat to dry soil or drought usually caused by heat. The slowing up of root action and lack of sufficient nourishment reacts on plants in various ways. Apples, especially 'Cox's Orange Pippin,' may show brown dead spots on the leaves which we often call drought spots, or may show browning or curling of the margins very similar to the symptoms of potash deficiency. Rhododendron leaves, besides assuming a yellowish-green colour, slowly develop this scorch at the edges of the leaves with a tendency to roll downwards. Many fruits and vegetables are affected in one way or another by dry conditions either by the dryness or when the check caused by this dryness is followed by an abundance of moisture. Taking the question of actual dryness first, we know the effect of shortage of water to the roots of Tomatoes is to cause the flowers to drop and when the first ones fall it is already late to start correcting the fault. Dryness of the atmosphere will result in the pollen of Tomatoes not being able to germinate freely causing the condition called Dry Set in which the little fruits do not swell but remain only about $\frac{1}{4}$ -inch in size. Recent research has enabled us to correct this fault even at a late date by spraying the trusses with growth hormones so that the fruits grow to normal size although they are without seeds. This faulty pollination may give a crop of very small tomatoes (chats), or the fruits may be badly shaped and one-sided, or hollow on one side, and so on. In the main the cause is too dry an atmosphere. While the Tomato fruit is very young, extreme dryness at the roots causes other troubles and a very common one is Blossom End Rot. The water shortage causes death of some of the cells in the young fruit and as it enlarges a circular black and sunken area appears at the end of the fruit opposite the stalk. It need not occur on later trusses if the plants are carefully tended and it is more common in pot and boxed plants in greenhouses, although it may occur on outdoor plants in light soils. Turnips in dry soils may show a condition known as Brown Heart where the inside tissues are discoloured brown. Although this can result from a deficiency of the trace element Boron, it is also a result of drought in some gardens.

DROUGHT FOLLOWED BY PLENTIFUL WATER

When a plant has suffered from drought for some considerable time and then receives plenty of water, it is common for the fruits, or in the case of vegetables, the fleshy roots, to split. Tomatoes react quickly

in this case, especially if growth is also stimulated by a heavy dressing of sulphate of ammonia or other fertilizer. Even Plums can be affected by these kinds of conditions. Carrots are well known to split badly and Turnips often do it. The last named may heal as do the Carrots, but sometimes in continuing wet weather they develop a soft greyish rot of the inner tissues and soon only a hollow shell of the turnip is left.

Potatoes are ideal for demonstrating the curious effects of dry and wet weather extremes. There is the well-known Hollow Heart which is a cavity in the centre of the potato, very common in some varieties, so that some people plant varieties like 'Great Scot' as close as 9 inches in the row to keep the tubers smaller. It is, however, a fact that given the right weather conditions on certain soils any variety may show hollow heart and I have seen 'Majestic' of seed size in midsummer all showing it. The reason is that in dry soil the centre of the tuber will be the first part to be affected by water shortage and the tissues there dry so that any subsequent and quick growth causes the first split which then enlarges into a cavity. Another drought symptom in potatoes may be seen when the surface cracks so that some tubers look as if they had at some time been slashed with a razor. The cracks are often so deep and numerous that it is impossible to peel the potato and have any of it left to eat.

In some varieties of Potatoes such as 'Arran Pilot' which have long-shaped tubers and suffer drought, the tubers, when rain comes, not only grow again at the rose end but begin to rot away at the opposite or heel end. We call it Jelly End Rot and the reason for it is that the foliage is too exhausted to be able to supply enough food to the tubers so the growing end gets its nourishment by robbing the heel end and the latter rots and withers away. It is a type of second growth, and there are other types perhaps better known to most gardeners which are seen in seasons of great dryness followed by much rain. There is, for instance, the type known as Gemmation, where the second growth occurs at the eyes, each swelling out into a knob and forming those queer shaped tubers we so often see reproduced in newspapers. More commonly the tuber sends out another underground stem or stolon and forms another tuber and may even do this again so that we lift a string of tubers of gradually diminishing size. Often a stolon is not formed but the tuber grows longer with just a waist to mark the end of the previous growth, the skin on the new part being always smoother than that of the older part. An unusual condition is when the young tubers grow and actually send up stems and foliage later in the same summer that they are formed. I consider this is the worst type of second growth as there would be hardly any crop.

EXTREME WETNESS

We pass from extremes dryness to excessive wetness. The very wet season has its troubles too, but I think not nearly so many as we get in drought years. Probably the best known adverse effect of extreme wetness is waterlogging which checks growth and may even kill trees. But I would like to draw your attention to an abnormal condition caused by too much moisture in both the soil and atmosphere. I refer to the



Colour photograph by George Sheriff

FIG. 25—*Meconopsis betonicifolia* with an unnamed species of *Polygonum* in a clearing of the *Abies* forest below the Tسانang La, S E. Tibet, at an altitude of 10,500 ft.
(See p. 110)



Photo, Sutton & Sons Ltd

FIG. 26—Sweet Pea 'Hooded Grandiflora'



A. Malby

FIG. 27—Sweet Pea 'Ecstasy'



FIG. 28—Sweet Pea 'Bluebell' (See p. 97)



FIG. 29—Sweet Pea 'Cynthia Davis' (See p. 98)



FIG. 30—A variegated form of *Hydrangea macrophylla* var. *Mariesii* (See p. 111)

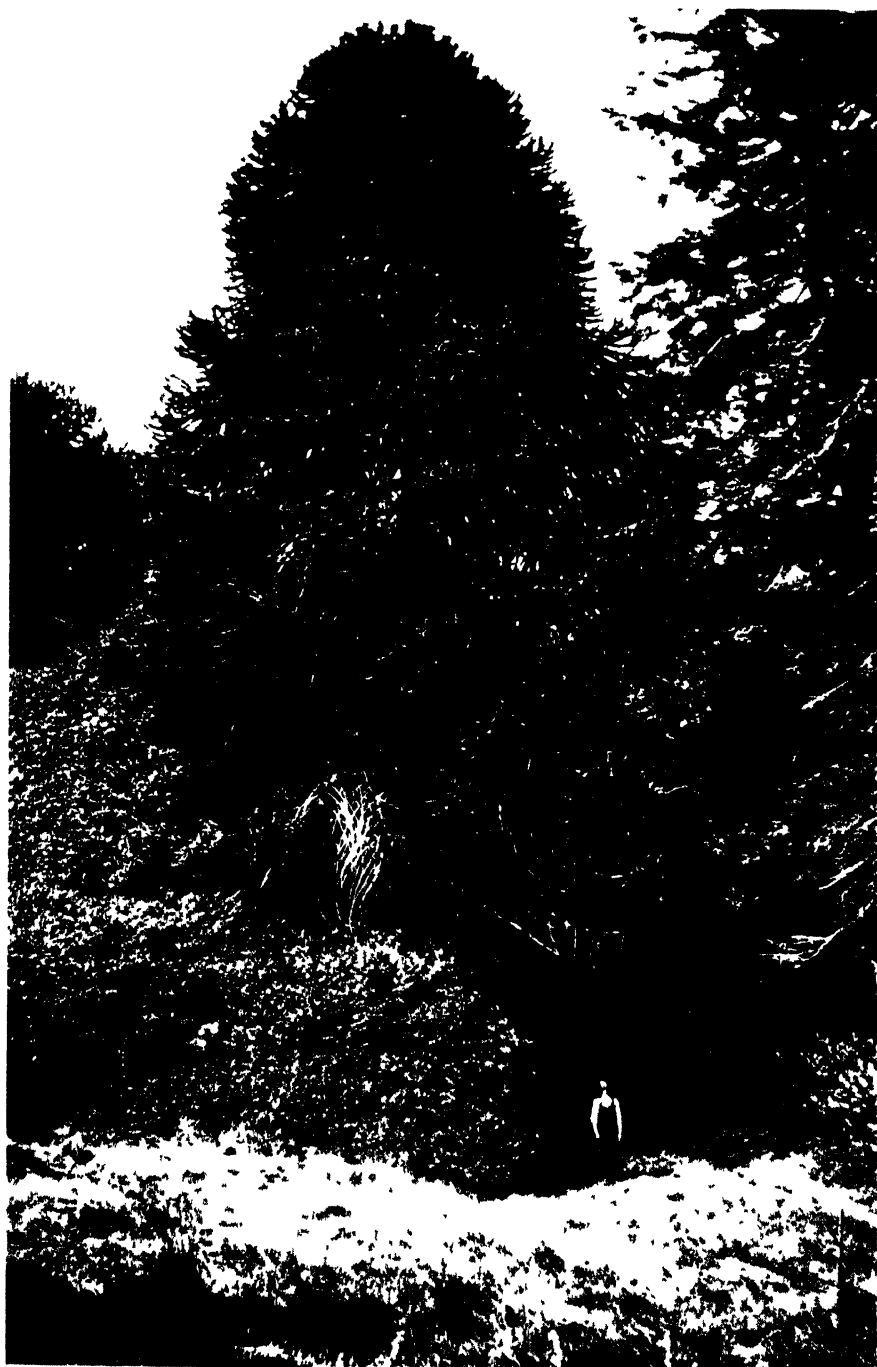


FIG. 31—An exceptionally large Monkey Puzzle (See p 113)



FIGS. 32, 33—*Clematis Stanleyi* (See p 113).



Photo, N. K. Gould

AWARD OF GARDEN MERIT

FIG. 34—*Cotoneaster conspicua* var. *decora* (See p. 120)



FIG 35—*Lysichitum camtschaticense* at the foot of the Rock Garden, Wisley
(See p 122)



Photo R A Malby

FIG. 36—A hundred flowers from the open from R H S Garden, Wisley, exhibit February 17, 1948 (See p 115)

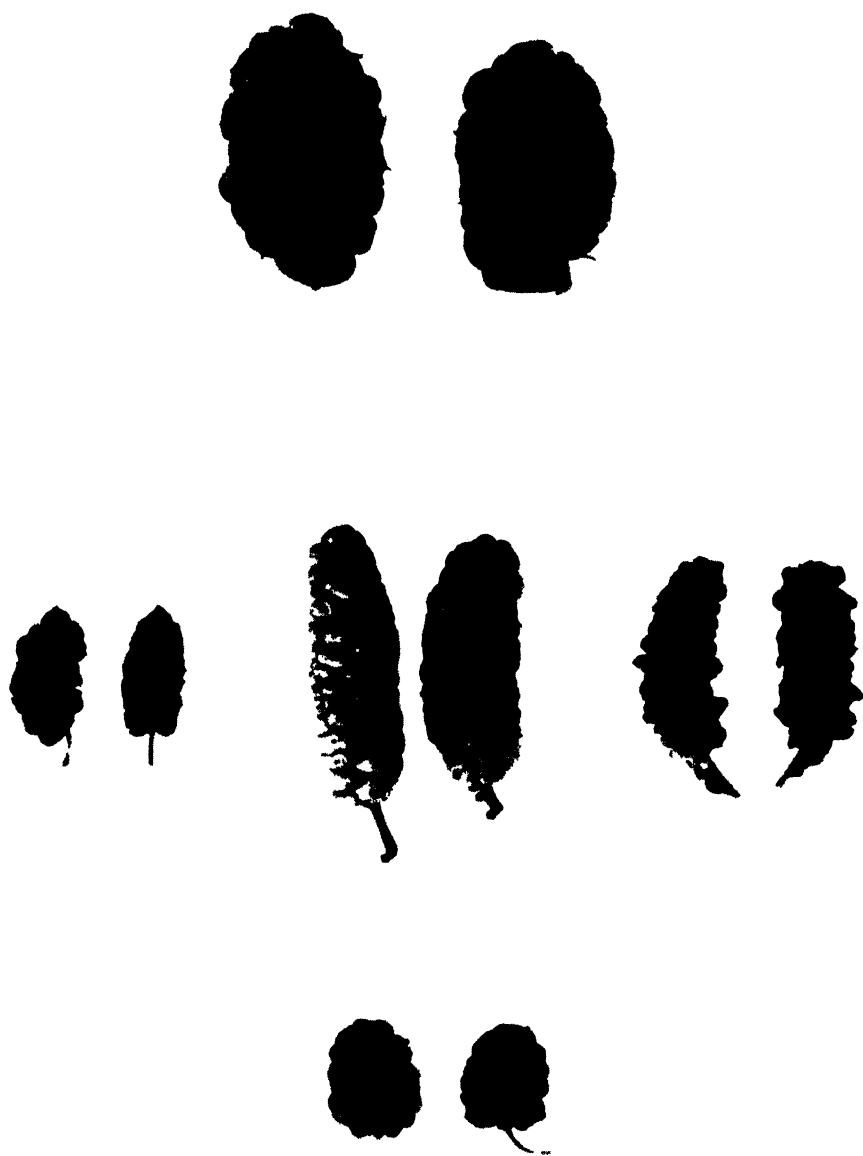


FIG. 37—The origin of the Black Mulberry (黒桑)
top: *Morus alba* $2n = 28$
centre: *Morus cathayana* $2n = 56$ (left); $2n = 84$ (centre); $2n = 112$ (right)
bottom: *Morus nigra* $2n = 308$.
(All slightly enlarged)



FIG. 38 Fleshy scales of Tulips damaged by exposure to sun after lifting
(See p. 107)

FIG. 39 Cracking and splitting of Tomato fruits

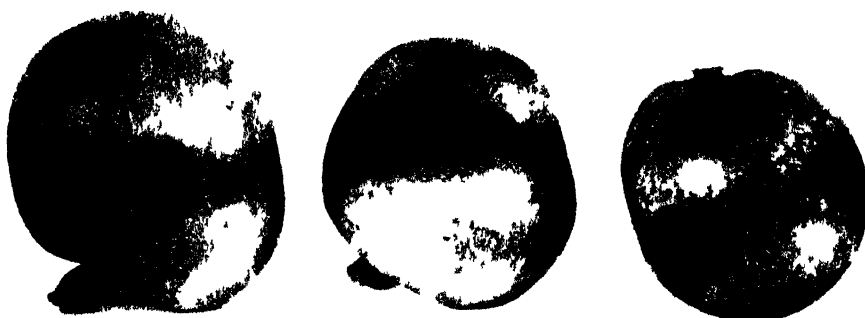


FIG. 40—Frost damage to Apples. Central band of rough skin cracks
and irregular shape. Variety 'Laxton's Superb' (See p. 105)



Colour photograph by George Sherriff

FIG 41—*Meconopsis latifolia* growing in boulder scree at 11 000 ft , near Bandapur, Frin Valley, Kashmir (See p 110)

condition we call Edema or Dropsy which appears as whitish or brownish corky looking excrescences on the leaves, shoots and other parts of certain plants. It is usually seen in greenhouse plants, especially in freshly rooted cuttings in propagating pits. The reason for the appearance of these unsightly excrescences is that the atmosphere contains too much moisture while the roots are taking in abundant water. The foliage cannot get rid of the surplus water so that groups of surface cells elongate and become very swollen and full of water. They then burst and dry up, but this process goes on and forms the rough warty patches on leaves or shoots which indicate the trouble. Indoors the cause is too wet and close an atmosphere, while in outdoor bedding plants the reason is rich manuring causing strong root action in a wet season. The trouble is rare outdoors but not uncommon in glasshouses and the remedy is better ventilation and reduced watering. Picking the affected leaves should not be done as it reduces the capacity of the plant to transpire and so aggravates the condition. Dropsy can be caused to Tomatoes if they are sprayed with oil emulsions against insects when the soil is wet and the atmosphere humid, and for this reason, such treatments are advised only in dry atmospheric conditions.

HAIL

The last kind of weather we have to discuss is hail. We get hail damage fairly often at Wisley with the result that annual flower stems may be injured and stripped of leaves, Beetroot and Spinnach are torn and shot-holed, and Onion leaves pitted with deep scars. Fruit suffers too and it is extraordinary to see what hailstones can do to the surfaces of fruits although they appear to bounce off. In young Apples there may be small but deep pits with torn skin above. Some Fellows have told me that they have picked off young fruits which are badly marked. This is, I think, not necessary because a good deal of what we call June drop may still occur even in July and it is better to wait as long as possible before reducing the total number of fruits even though hail may have damaged some of them. Another reason is that the fruit soon forms a healing layer underneath the injury so that the mature apples are quite sound although showing many spots or pock marks. We have stored many such apples at Wisley and observed them for some months. They kept as long as they could be expected to, and when they became over ripe and rotted from other causes there was no sign that the rots had started in the healed up hail spots which, in our view, do not in any way hasten decay.

These are some examples of the way in which adverse weather conditions can affect our plants and I conclude by hoping that you have been interested.

HIMALAYAN PLANTS IN THE FIELD

George Taylor, D.Sc.

FROM time to time it is hoped to reproduce habitat photographs of the more striking plants collected by LUDLOW and SHERRIFF during their extensive explorations in the Himalaya, in which they have travelled widely in search of plants in Kashmir, Sikkim, Bhutan and especially in south-eastern Tibet. It is, perhaps, too much to expect that all the species to be depicted will become established in gardens in this country—in many cases it is almost impossible to reproduce here the conditions required for their survival. Usually it is impracticable during a collecting expedition, without prolonged research into local edaphic and climatic factors, to do more than indicate habitat conditions in very general terms. Our cultural methods are largely empirical and, considering the multitude of plants from diverse parts of the globe which flourish in our gardens, they have been remarkably successful. Nevertheless, many fine garden plants to test cultural skill may still confidently be expected to come from these regions, for it was obvious, when in Tibet in 1938, that many species were extremely local in their distribution within the area explored, and every small valley, every scree and outcrop and every alp might hold something of distinction, but it was impossible, in the time available, to explore all the promising localities. It is not likely that any very remarkable botanical discoveries remain to be made, but without doubt many species of high garden merit await detection on the eastern Himalaya and in south-eastern Tibet.

As the first illustrations, two species of *Meconopsis* have been chosen.

The majority of the species of *Meconopsis* in south central temperate Asia inhabit the alpine regions of south western China, spread over the neighbouring gorge and plateau country on the confines of south-eastern Tibet, and extend along the Himalaya as far as Nepal, whence westwards the density of species rapidly diminishes. Towards the west of this range, judging from existing records, the species tend to be severely limited and spasmodic in their occurrence and several are known from very circumscribed areas. In Asia the genus reaches Chitral, where *M. neglecta*, yet only known from a solitary ill-documented specimen, is the most westerly outlier. In the neighbouring state of Kashmir, two prickly blue Poppies, *M. aculeata* and *M. latifolia*, have their homes. Both have been in cultivation in this country, though they have never been widely grown. This, perhaps, is not surprising in the case of *M. aculeata*, which is apt to become rather degenerate in vigour and in flower colour, but the apparent indifference to *M. latifolia* is more puzzling. The species is usually recommended as suitable for dry situations, and, when happily established, obligingly increases by self-sown seedlings.

For many years *M. latifolia* was a feature of the rock garden at the Royal Botanic Garden, Edinburgh, where it was the usual practice to supplement the natural dispersal of its seed by throwing some into soil pockets and rock crevices. Usually the petals are a glorious Cambridge-blue, the ideal foil for the clustered yellow anthers, and the flowers are faintly fragrant. The species is known only from northerh Kashmir, at

altitudes between 10,000 and 13,000 feet, and the accompanying coloured plate shows the species growing in its natural habitat amongst boulders and on rock faces in the Erin Valley near Bandapur.

No *Meconopsis* has enjoyed such universal popularity as *M. betonicifolia*, which for most people is *the* blue Poppy of Tibet. Undoubtedly all the superlatives and all the publicity lavished on this plant have given it a reputation which, unfortunately, it often fails to uphold. Many of the forms in cultivation are a mockery of the popular name, and even in Tibet the colour is not invariably the glorious sky-blue usually associated with the species; it may be grape-purple and, for a blue Poppy, it may occasionally masquerade in disreputable shades of pink. There are, however, splendid forms in cultivation, but there is a tendency for these to produce offspring of rather uncertain colour. In south-eastern Tibet the plant thrives best on the edge of mountain streams where there is a thin cover of shrubs such as *Berberis* and *Salix*, although it often forms magnificent clumps on cool, damp, deep accumulations of humus in clearings in the *Abies* and *Rhododendron* forest. The coloured plate depicts the species growing in company with a fine species of *Polygonum*, not far from the locality where it was re-discovered by KINGDON-WARD, and subsequently introduced by him to cultivation.

As a progenitor of several hybrid Poppies, *M. betonicifolia* has proved of great value, as it impresses its perennial habit on the offspring. It was the original male parent of the hybrids $\times M. Musgravei$ (*M. betonicifolia* \times *superba*) and $\times M. Sheldonii$ (*M. betonicifolia* \times *grandis*), plants of outstanding beauty. *M. Sheldonii* has spontaneously appeared in several gardens where the parents have been grown near each other. It is usually a vigorous plant, readily propagated by offsets. I suspect that many of the plants now grown in gardens as *M. betonicifolia pratensis* and *M. grandis* are really this fine hybrid which perpetuates the rich colour of the best forms of *M. betonicifolia*.

M. Musgravei is not such an amenable plant and it is doubtful whether it survives in cultivation. Apart from the plants raised by MR. C. T. MUSGRAVE, which flowered at Wisley in 1933, I am uncertain whether the hybrid has occurred elsewhere. The seed parent, *M. superba*, has never been widely established in gardens, probably because it is such a shy seed producer in this country and also on account of its intolerance of our damp winters. It was, indeed, the lack of fecundity which prompted MR. MUSGRAVE to stimulate the species with the pollen of *M. betonicifolia*, and the result of this mating produced a plant combining the perennial vigour of *M. betonicifolia* with the attractive foliage and beautiful pure white flowers of *M. superba*. Alas, the temper of *M. Musgravei* proved too fickle, and the original plants after a year or two died out. The recent introduction of seed of *M. superba*—sent by MAJOR SHERRIFF from Ha, west Bhutan—may give opportunities for repeating the breeding of *M. Musgravei*.

FURTHER NOTES ON HYDRANGEAS

Michael Haworth-Booth

THE conclusion of certain experiments I have made, and in particular the results of recent research in America, prompt me to write these further notes on the cultivation of the Hydrangeas.

As most of us know, certain varieties usually have flowers of a pure blue colour in a good, rich acid loam, whilst on a limy soil, or even a pure peat soil on a steep slope subject to leaching of the soluble mineral content, the plants are unthrifty, chlorotic and tend to have pinkish flowers.

In the course of one experiment on such a peat slope I left a number of "control" plants to die, but resuscitated six plants completely by watering them weekly with a solution of $\frac{1}{4}$ oz. of sulphate of iron in 1 gallon of water. Fresh strong shoots appeared bearing deep green leaves and root growth recommenced. The flowers, however, remained a weak pink colour on the three plants not given additional treatment. The other three were also given a weekly watering with a solution of $\frac{1}{4}$ oz. of aluminium potassium sulphate in 1 gallon of water. The flowers opening a few weeks after the commencement of the treatment were of a pure and excellent blue.

The results of the American experiments * which, unlike my own, were made under properly exact conditions, explain these reactions. Briefly, it appears that a sufficiency of available iron is the factor controlling health, given ordinarily favourable circumstances otherwise, and available aluminium is the factor controlling blueness of flower colour. Iron does not cause blue flowers and aluminium does not favourably affect health and vigour. The pinkness of flower and chlorotic debility of Hydrangeas grown in limy soil are due to the fact that alkaline conditions (indeed even from pH value, roughly, 6.70 and upwards) restrict the availability of both iron and aluminium.

From these facts we may thus deduce a number of horticulturally interesting indications. For example, I have long desired to grow the orange-flowered 'Vulcan,' the rich pink 'Parsifal,' the crimson 'Munster' and the red 'Carmen' near my Cambridge blue 'Vibrayes.' But in our rich, acid soils, the flowers have always shown an objectionable purplish tinge which has spoiled their colours. By growing these in limed soil which will inhibit their intake of aluminium and by feeding them with iron to prevent chlorosis I believe the result will be healthy plants with flowers free from any bluish tone. Beds thus arranged were planted last August and next season will show whether this supposition is correct.

A further point of interest arises with regard to the varieties of *H. serrata*. Those of the type of the *H. japonica* of SIEBOLD, such as the varieties *intermedia*, *rosalba* and 'Grayswood,' have never shown any tendency to blue colour in the sepals of the sterile, marginal flowers, although the soil conditions are such as to favour the production of

* ALLEN, R. C. (1943). "Influence of aluminium on the flower colour of *Hydrangea macrophylla* DC. *Contrib. Boyce Thompson Inst. (N.Y.)* 13 (4) 201-242.

blue flowers in most varieties of *H. macrophylla* DC. It will be interesting to observe whether the anthocyanin pigment of these types will turn blue under the application of aluminium in the same way as that (classified as delphinidin 3-glucoside) of *H. macrophylla*. I would hazard a guess that they will not, as the red pigment, in the case of these white-flowered *H. japonica* Siebold types, is only developed as the flower fades. I hope to be able to verify these points next season. Should the supposition prove correct we shall have a ready means of deciding hybridity in many clones whose position has been, up to now, obscure. The claims of *H. japonica* Siebold to specific rank, as distinct from *H. serrata*, may also receive some encouragement.

In the American experiments a great many forms of aluminium were tested. Most forms were injurious, aluminium ammonium sulphate, or common ammonia alum causing injury at concentrations as low as 0.001 per cent. On the other hand, aluminium ammonium citrate is only harmful at one per cent., but this form is not readily available in this country at present.

Gardeners suffering from limy soils can certainly find grounds for encouragement owing to the readiness with which chlorosis and ill health can be cured by applications of sulphate of iron ($\frac{1}{4}$ oz. to 1 gallon of water). Furthermore, it seems that there is no reason why they should not have blue flowers as well if they so desire, by watering with potash alum at the same strength.

As regards the helpful effects of iron these are evident enough, but it should be pointed out that an excess of this can easily be given. The plant requires the right amount, not unlimited quantities. Of the various forms of iron tested the citrate was again markedly less toxic than the sulphate, 0.001 per cent. of the sulphate being injurious whilst 1.0 per cent. of the citrate was needed to cause harm.

The "blueability" of the various varieties differs very widely in accordance with their readiness to absorb aluminium compounds. In my experience the varieties 'Générale Vicomtesse de Vibraye' and *H. serrata* var. *acuminata* are outstanding, but there is a large second category which includes 'Blue Prince,' 'Gertrude Glahn,' 'Bluewave,' 'Mousseline,' etc.

Obdurate varieties, such as 'Mein Liebling,' *rosea*, *Mariesii*, etc., assumed the blue colour, however, when the buds and expanding sepals were sprayed with an 0.5 per cent. aluminium compound solution several times and with the addition of a 'spreader' to ensure even coverage.

To sum up, if the amateur wants blue Hydrangeas he must first select varieties that "blue" readily, then he should feed iron, to get strong healthy plants, by weekly watering during the early part of the growing season. Finally he should arrange to give a weekly watering with the aluminium solution from the time the flower buds are seen to be forming until the flowers open. This treatment should ensure blue colouring even in unfavourable soils. In most cases only a few waterings with the two solutions are necessary. According to the pH scale test, as an indication of soil acidity, blue flowers are normally produced at pH 5.13, mauvish at pH 5.50, mauvish pink at pH 6.51 and pink at 6.89 and over.

NOTES FROM FELLOWS

An exceptionally large Monkey Puzzle

IF there be one tree I do not like it is the Monkey Puzzle. Those who believe in the Darwinian theory will doubtless attribute this prejudice to a simian ancestry, but I like to think it is due to the gaunt and graceless habit of the species as seen in this country. In the more humid climate of Ireland these faults are less apparent and there specimens may be found so well furnished with boughs that they are almost pleasing to the eye. Such a one is growing in the demesne of Mount Congreve, a few miles south of Waterford. In this example—incidentally by far the largest I have ever seen—the branches are semi-drooping and so dense that the tree's normal austerity of outline is not noticeable (Fig. 31). Judging by eye alone I estimated the height of this tree as being approximately 78 feet. Since BEAN gives 80 feet as the maximum for this *Araucaria*, it would seem that the Mount Congreve specimen can be numbered amongst the largest in the British Isles. Some idea of its dimensions may be formed by the figure shown in the photograph, who is standing, not beside, but at least 15 feet in front of its trunk. In its native habitat (which lies in the southern third of the Andean range) *Araucaria araucana*—better known as *A. imbricata*—always appears to shed its lower branches when fully mature: as a consequence old specimens generally assume a more or less umbrella-like shape. The Mount Congreve tree is said to cone freely and I understand self-sown seedlings are frequently found growing round its base.

COLLINGWOOD INGRAM

Clematopsis Stanleyi

This plant of the African plateau is of great botanical interest, but it is also outstandingly beautiful. I do not know if it is in cultivation in this country. I have certainly never seen it here. It is illustrated in the *Botanical Magazine* of 1891. HUTCHINSON, in the *Kew Bulletin*, 1920, described the genus as a link between the tribes Anemoneae and Clematideae, the separation from *Clematis* being based on the aestivation of the sepals.

I saw *Clematopsis Stanleyi* growing near Pretoria in January last year. It is fairly common in the Transvaal and extends northwards into Rhodesia and Angola. It is about 2 feet high, with nodding flowers. The sepals are a delicate pink with a bunch of golden stamens. The seeds are reminiscent of *Anemone sulphurea*. The photographs were taken in the National Botanic Garden at Kirstenbosch near Cape Town. It should be possible to grow *Clematopsis Stanleyi* in the warmer parts of Great Britain. (Figs. 32, 33.)

A. Q. WELLS

Winter Hardiness

Bringing delicate plants through the winter in an English garden is difficult enough. Sometimes if the winter is mild, such plants as *Carpenteria*, and certain of the less hardy *Viburnums*, *Deutzias*,

Daphnes and even *Clianthus puniceus* can be brought through with little extra protection beyond that which was given at the start in the form of a south wall, or a thick hedge. In other years, not all the hessian, bracken and straw seems adequate to keep out the frost and the subsequent sunshine and the precious plant is killed out completely or at least down to ground level.

I found that the protection of shrubs in gardens around New York and Philadelphia, however, was a far more serious business. There it is apparently impossible to gamble with the weather as we sometimes do. The gardens in winter often look like an undertaker's parlour, with such things as *Daphne cneorum* and *Daphne Genkwa* packed up with straw beneath a coffin-like structure of slatted wood.

In November or early December the work of protection begins in earnest, and the "coffins" often remain in position until the middle of April. Large specimens of Box and Yew 6 feet high were entombed beneath these slatted structures, and peering through the slats revealed nothing but masses of straw or hessian, as a means of added warmth.

Many smaller plants like *Bellis perennis*, which in this country are of more or less perennial duration, are sown each spring and treated like annuals, because of the difficulty of bringing through the winter in the open any thing with soft and tender foliage. For the same reason the herbaceous borders are filled with annuals and biennials in the spring, the latter having been wintered in frames or houses. I found Lupins, Delphiniums and Anchusa among the most difficult perennials to winter, and the only successful people who grow them on the Eastern Seaboard are those who raise them from seed each year. Consequently the large clumps of Delphiniums are practically unknown.

In some gardens I found that the growth of many herbaceous plants was left on throughout the winter, and only removed after the young shoots had begun to show in the spring. This was done more as a protection against snow than frost and successfully kept the lighter falls of snow from blocking the crowns and so saved them from subsequent rotting from damp.

After the autumn forking of the borders had been done a really thick layer of dry hop manure was placed over the whole border, so that the crowns were covered to a depth of several inches, and over this light branches of trees were placed to keep everything in position for the next five months.

Gardening in America is a very different matter from gardening in this country. There is very little you can do with plants in the open in winter in the New England States, in New York or Pennsylvania, which means that the spring rush of work is increased tenfold. In the periods of intense heat in summer there is again a limit to what can be done in the open, and most of the work has to be done in the early morning or late in the evening. April, May and June are the three busiest months in the year, when everything has to be done in a hurry, while September and October are spent in crowding in all the work that would normally be spread over the whole winter in this country.

ELIZABETH HESS, N.D.H.

A HUNDRED FLOWERS FROM THE OPEN AT WISLEY

(Shown on February 17, 1948)

AMONG the very extensive collection of shrubs and herbaceous plants at Wisley, there are many which come into flower, in favourable weather, during the first quarter of the year. It is very usual, however, for the flowers of some to be discoloured, or even completely ruined, by a sudden cold spell following a mild period.

During the first six weeks of the present year, and particularly in the first half of February, conditions were ideal for early-flowering plants with the result that it was possible to exhibit at Vincent Square, on February 17, vases of one hundred different species and varieties grown in the open at Wisley without any form of protection (Fig. 36). From the list we publish it will be seen that some are hardy plants which may be relied upon to flower bravely every year, whatever the weather, although often at a later date. On the other hand, it is some years since we had the frail flowered Rhododendrons such as *R. × praecox*, *R. mucronulatum*, *R. moupinense* and *R. leucaspis* in such perfect condition, and it was difficult to convince some who saw the exhibit that *Prunus Davidiana*, *P. Conradinae* and *P. Pollardii* had not been opened indoors. Two days later frost and a snowstorm destroyed the majority of the flowers. A number of Crocuses were also in flower at this time but were not picked for the exhibit.

Abeliophyllum distichum.
Alnus cordata.
Bergenia ligulata speciosa.
Camellia japonica.
C. japonica alba plena.
C. japonica 'Nobilissima.'
C. japonica × saluenensis.
Chaenomeles japonica.
Chaenomeles lagenaria.
Chaenomeles lagenaria 'Nivalis.'
Chimonanthus praecox.
Clematis balearica.
Cornus mas.
Corylus Avellana contorta.
Cyclamen ibericum.
Cyclamen ibericum album.
Daphne Laureola.
D. Mezereum.
D. Mezereum alba.
D. tangutica.
Eranthis × Tubergenii.
Erica carnea 'Queen Mary.'
E. carnea 'Springwood.'
E. carnea 'Springwood Pink.'
E. × darleyensis.
E. lusitanica.
E. mediterranea.
Forsythia × intermedia spectabilis.
F. ovata.
F. viridissima.

Galanthus byzantinus.
G. caucasicus 'Straffan Variety.'
G. nivalis plenus.
G. plicatus.
Garrya elliptica.
Hamamelis japonica.
H. japonica arborea.
H. japonica Zuccariniana.
Helleborus corsicus.
H. intermedius.
H. orientalis var.
Iberis semperflorens.
Iris reticulata 'Cantab.'
I. reticulata 'Wentworth.'
I. unguicularis.
I. unguicularis alba.
Jasminum nudiflorum.
Lathraea clandestina.
Leucojum 'Gravetye Variety.'
L. vernum.
Lonicera fragrantissima.
Mahonia Aquifolium.
M. Bealii.
M. japonica.
M. napaulensis.
Narcissus Bulbocodium.
N. cyclamineus.
N. lobularis.
N. Romieuxii.
Nuttallia cerasiformis.

<i>Petasites albus.</i>	<i>R. irroratum.</i>
<i>Pieris japonica.</i>	<i>R. 'Jenny Lind.'</i>
<i>P. taiwanensis.</i>	<i>R. leucaspis.</i>
<i>Primula denticulata.</i>	<i>R. lutescens.</i>
<i>P. vulgaris.</i>	<i>R. moupinense.</i>
<i>Prunus Amygdalus.</i>	<i>R. mucronulatum.</i>
<i>P. Amygdalus Pollardii.</i>	<i>R. × Nobleanum.</i>
<i>P. cantabrigiensis.</i>	<i>R. × praecox.</i>
<i>P. cerasifera.</i>	<i>R. racemosum.</i>
<i>P. cerasifera nigra.</i>	<i>R. 'Seta' (spinuliferum × moupinense).</i>
<i>P. Conradinae semiplena.</i>	<i>R. sutchuenense.</i>
<i>P. Davidiana.</i>	<i>R. 'Tessa' (praecox × moupinense).</i>
<i>P. subhirtella autumnalis rosea.</i>	<i>Salix daphnoides.</i>
<i>Pulmonaria saccharata.</i>	<i>S. gracilistyla.</i>
<i>Rhododendron arboreum roseum.</i>	<i>S. purpurea.</i>
<i>R. 'Bric-à-Brac.'</i>	<i>Sarcococca Hookeriana digyna.</i>
<i>R. 'Choremia' (haematodes × arboreum).</i>	<i>Scilla bifolia.</i>
<i>R. 'Christmas Cheer.'</i>	<i>Symplocarpus foetidus.</i>
<i>R. 'Corma' ('Choremia' × chaetomallum).</i>	<i>Trachystemon orientale.</i>
<i>R. intricatum.</i>	<i>Viburnum fragrans.</i>

CONTRIBUTIONS FROM THE CYTOLOGICAL DEPARTMENT, R.H.S. GARDENS, WISLEY

I. THE ORIGIN OF THE BLACK MULBERRY

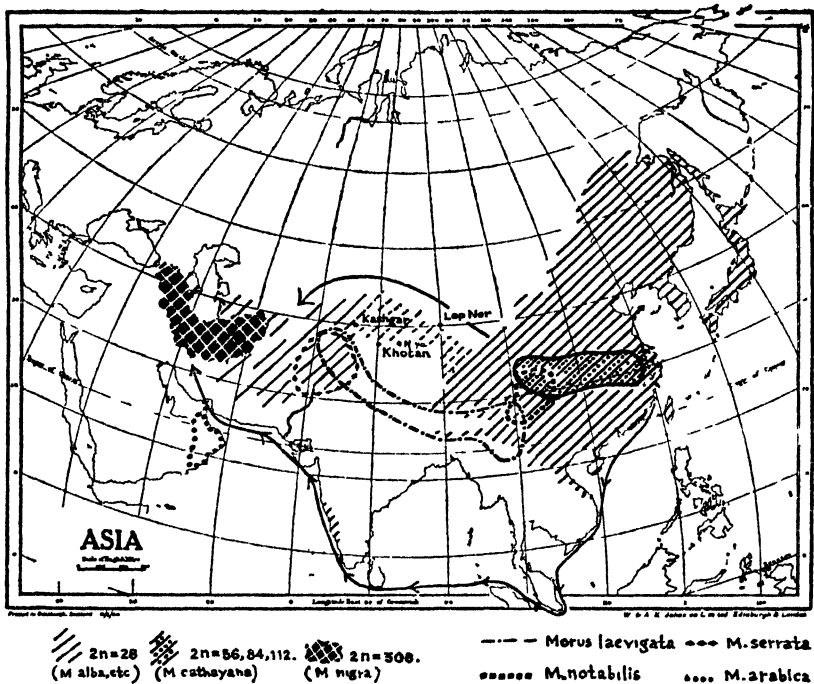
E. K. Janaki Ammal, D.Sc.

THE Black Mulberry, *Morus nigra*, occupies a unique position amongst flowering plants in having the highest chromosome number ($2n = 308$) recorded for any known species (THOMAS in DARLINGTON and LA COUR, 1947). The origin of this species therefore presents a problem of special interest.

All the varieties of *M. alba* so far examined are diploids ($2n = 28$), except the garden hybrid 'Makado' in which OSAWA found 42 chromosomes and which is therefore a triploid (DARLINGTON and JANAKI AMMAL, 1945). To this group of diploids I can now add four other species, *M. rubra* and *M. microphylla* from N. America, and *M. serrata* and *M. laevigata* from the Western Himalayas. These counts were made on plants grown at Kew and Wisley from plants and seeds sent from their native habitats. I have also been able to confirm the count of OSAWA (*op. cit.*) for the diploid *M. acidosa* of Eastern China (*M. australis*) from a plant growing at Kew. *M. cathayana* is easily distinguished from *M. alba* by its cylindrical fruit and hairy leaves. Two plants of this species had been grown at Kew from seeds collected for the Arnold Arboretum by WILSON in 1907 in W. Hupeh. These were found to have $2n = 56$ ($4x$) and $2n = 84$ ($6x$), while a third plant, from Szechuan, growing at Kew, which was sent by VILMORIN AND CO. in 1910, had $2n = 112$ ($8x$). In general appearance this octoploid ($8x$) resembled *M. nigra* more than the tetraploid

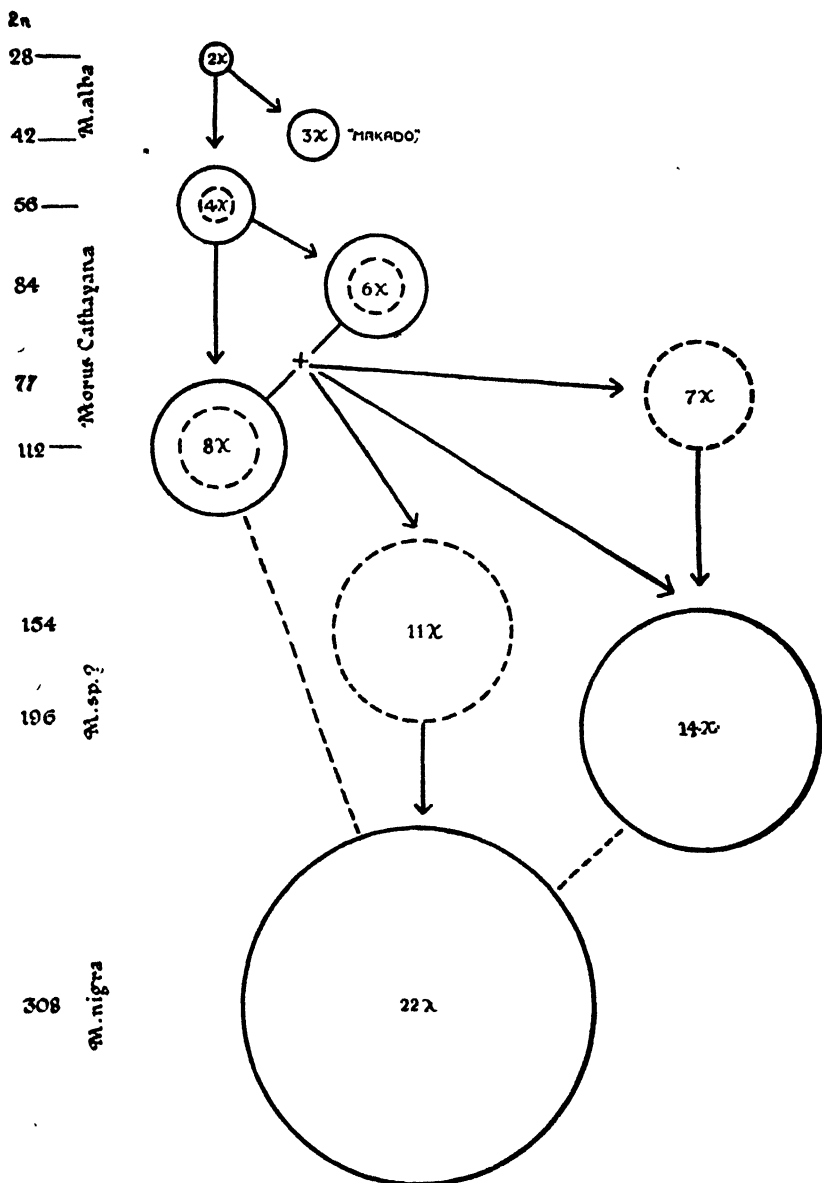
and hexaploid from W. Hupeh. The tetraploid plant was predominately male but produced a few hermaphrodite catkins at the end of the season which developed into irregular looking fruits (see Fig. 37). About 10 per cent. of its pollen was unreduced. It is to be presumed that the hexaploids have been produced by non-reduction on one side from the tetraploids, since they came from the same locality.

The discovery of these three forms of *M. cathayana* helps to bridge the gap between the two economic groups, the diploid species and the 22-ploid. The series is $2x$, $3x$, $4x$, $6x$, $8x$. . . $22x$. Probably a further search for *M. cathayana* in Central China, or the allied species *M. notabilis* (see distribution map), will bring to light forms of even higher chromosome numbers than those at Kew, thus providing a further link with *M. nigra* and indicating its probable method of origin. In the accompanying diagram (p. 119) I have indicated the ways in which a 22-ploid *Morus*, like *M. nigra*, could be synthesized from the existing polyploids.*



Map showing the distribution of diploid and polyploid species of *Morus* in Asia. The broken lines connecting Kashgar with the ancient buried cities of Khotan Niya and Lop Nor in the Tarim Basin show the course of migration of mulberries along the once fertile regions of Central Asia. Stumps of mulberries in the desert sands mark this route. The ancient sea route connecting China with S.W. Asia is also shown.

* When an octoploid $8x$ ($2n = 112$) *Morus cathayana* is crossed with a hexaploid $6x$ ($2n = 84$) the progeny expected is a heptaploid $7x$ ($2n = 98$) when fertilization is between two reduced gametes. If, however, the octoploid ($8x$) produces occasional unreduced gametes it is possible that some of the offspring will be $11x$ ($2n = 154$).



The Black Mulberry, which has so far not been recorded in the wild, has been a cultivated plant from very ancient times and is reputed to have risen in Persia. It will not be surprising, however, if its ancestral home is found to be nearer the mountains of Central China, which was probably the centre of origin of the genus *Morus*. The Table summarizes our knowledge of the distribution and chromosome numbers of *Morus* up to date.

Somatic doubling of such an 11-ploid plant can give rise to a 22-ploid ($2n = 308$) of the *M. nigra* type. This can also be attained in a more roundabout way by hybridization between the octoploid ($2n = 112$) and a 14-ploid ($2n = 196$) derived by fertilization of unreduced gametes from both parents, as indicated in the diagram.

TABLE
Chromosome numbers and distribution in *Morus*

BASIC NUMBER OF GENUS $x = 14$	ASIA		AMERICA	SEX
$2x$ (diploid)	<i>acidosa (australis)</i> <i>alba</i> var. <i>atropurpurea</i> " <i>Bungeana</i> " <i>cedrona</i> " <i>Kagayamae</i> " <i>mongolica</i> " <i>Morettiana</i> " <i>multicaulis</i> " <i>pendula</i> " <i>tatarica</i> " <i>urticaefolia</i> Seedling from Lahore Seedling from Teharan	E. Asia C. and Eastern Asia	<i>rubra</i> <i>microphylla</i>	Dioecious and Monoecious
$3x$ (triploid)	<i>laevigata</i> }	N.W.		
$4x$ (tetraploid)	<i>serrata</i> }	Hima- layas		
$6x$ (hexaploid)	'Makado' cult.	Japan		
$8x$ (octoploid)	<i>cathayana</i>	Hupei		
$22x$ (22-ploid)	"	"		Monoecious
	"	Szechuan		
	<i>nigra</i>	Persia (?)		

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- DARLINGTON, C. D. and JANAKI AMMAL, E. K., 1947: *The Chromosome Atlas of Cultivated Plants*. London.
DARLINGTON, C. D. and LA COUR, L. F., 1947: *The Handling of Chromosomes*. London.

AWARD OF GARDEN MERIT—LXXXII

389 COTONEASTER CONSPICUA VAR. DECORA

Award given June 30, 1947

THIS Cotoneaster is one of the most decorative and useful of berried shrubs for winter effect. The birds do not seem to take the berries, and during the winter of 1947-48 the large bush opposite the green-houses at Wisley was still a fine sight in February. The photograph reproduced was taken in January (Fig. 34).

Cotoneaster conspicua is a spreading evergreen shrub with erect ascending stems and rather stiff branches. In the var. *decora* the branches

are pendulous, so that a well-grown bush should be covered to the base. The leaves are small and are borne thickly on the branches. In a mild winter the shrub is evergreen. The flowers are small and white and cover the branches in spring, but it is for the brilliant scarlet berries that this plant is chiefly grown. These round berries are very freely borne and are about a quarter of an inch in diameter. They are slightly larger than those of *Cotoneaster microphylla*, a species to which this plant is closely related. They usually ripen in late September or early October and remain on the bush till the following February. This *Cotoneaster* should be planted in full sun and makes a suitable plant for the shrub garden or for the large rock garden. *Cotoneaster conspicua* is a native of South Eastern Tibet and was introduced by MR. F. KINGDON-WARD, who records having "a vivid memory of the impression that bubbling red cauldron of berries produced as seen from the top of the cliff." It received an Award of Merit in 1933, and there is a fine plate of it in the *Botanical Magazine* (t. 9554).

390 OXYDENDRON ARBOREUM

Award given April 14, 1947

This is one of the most brilliant trees for autumn colouring that we possess. The leaves are very persistent and it is not usually at its best till November. The colour is usually very deep red with more tints of crimson than of orange in it. *Oxydendron arboreum*, an Ericaceous plant, is a native of the Eastern states of North America. It is quite hardy and in the Woodland Garden at Wisley it has reached a height of thirty feet. It forms a slender almost fastigate tree, flowering only towards the top. The flowers are white and are borne during July and August in lax panicles six to ten inches long. This makes it a useful plant for the woodland garden, where there is generally no abundance of flowering shrubs at this season. Similar conditions to those provided for the larger leaved Rhododendrons will generally prove suitable. It will not grow satisfactorily on chalk. Propagation is usually by seeds, which are not very freely produced in this country and consequently it has never become a very common plant in gardens. *Oxydendron arboreum* was figured in the *Botanical Magazine* (t. 905) under the name of *Andromeda arborea*, a genus to which it is closely related.

391 CALLUNA VULGARIS VAR. ALPORTII

Award given April 14, 1947

This is one of the most valuable of the varieties of the common Ling for flowering in late autumn and early winter. It is a tall growing variety, often reaching two or even three feet in height. The foliage is an attractive dark greyish-green, while the flowers are deep crimson. It is probably the deepest crimson in flower among the closely related varieties of *Calluna vulgaris*. These Heathers should be grown in an open situation and grow best in a peaty soil in which the plants are not encouraged to grow very lanky. They will not grow satisfactorily on lime. The Heath garden is a particularly valuable modern development, but

apart from that, these Heathers are valuable for providing a border to the shrub garden or for covering dry banks, where they will effectively keep down the weeds once they have become established. The named varieties such as *Alportii* are best propagated from cuttings, layers or divisions of the old plants. This variety is also often known under the name *atrorubens*.

LYSICHITUM CAMTSCHATCENSE

N. K. Gould

THE species of *Lysichitum*, two of the most striking plants for the bog garden or waterside, are both herbaceous plants of ample proportions. The characteristic spathe and spadix inflorescences, which indicate their membership of the Arum family, appear in early spring as the first leaves unfold. Later, when the conspicuous spathes have faded, the plants continue to produce huge, Banana-like foliage.

The more common, the larger, and the earlier-flowering of the two, has yellow spathes, and for many years it was wrongly called, in gardens, as in botanical literature, *Lysichitum camtschatcense*. It was even figured in the *Botanical Magazine* (t. 7937) in 1904, and later received the R.H.S. Award of Merit, under this incorrect name. It is found wild in swampy places over a large area of N.W. America from Alaska to California, and its proper name is *Lysichitum americanum*.

The true white-spathed *L. camtschatcense* is known to occur wild in similar conditions from the Kamchatka peninsula southward along the Kurile Islands into Japan, and also on the Asiatic mainland near the mouth of the Amur River. The illustration shows this species flowering in the bog garden at Wisley, and in the background there is a small plant of the American species, showing its larger foliage.

Both are very easy to grow as long as their roots have access to abundant water. Propagation by division of the clumps presents no difficulty; and where the plants are really happy, as at Wisley, young plants often arise from self-sown seeds.

L. camtschatcense was given the Award of Merit when exhibited on April 29, 1947, by LORD ABERCONWAY.

WISLEY TRIALS, 1947

EARLY-FLOWERING CHRYSANTHEMUMS

AT WISLEY, 1947

One hundred and fourteen varieties were grown at Wisley in 1947; of these thirty-two were grown for the first time, having been selected for trial in 1946 by the Joint Committee of the Royal Horticultural Society and the National Chrysanthemum Society.

All the varieties, including those grown at Wisley for the first time, were given the warm water treatment as a precaution against Eelworm attack. This treatment we consider should be one of the necessary routine operations of Chrysanthemum cultivation.

The rooted cuttings taken from the treated stool, three grown naturally in spray form and three disbudded of each variety, were planted on a fresh site on May 8, 1947. The plants were stopped once, and in spite of the unfavourable season, grew satisfactorily, but unfortunately, the flowers of some varieties, particularly 'Fair Maid' and 'Vulcan' were materially damaged by a severe attack of Thrips, of which *T. fuscipennis* was the chief culprit.

The trial was inspected by the Joint Committee on August 7 and 28, September 10 and 30, 1947, who made their recommendations for Awards as given below.

FLOWERS WHITE

Marion (raised, introduced and sent by Messrs. H. Shoesmith Ltd., Mayford, Woking, Surrey). **A.M.** September 10, 1947, as a disbudded variety for cutting and garden decoration. 3 feet. Plant of erect, compact habit, with 20- to 26-inch long flower stems. Flowers double, $5\frac{1}{2}$ inches diameter, white shading to cream at the centre.

The following varieties have been retained for future judgment: COTSWOLD WHITE (Greenyer); CREAM BOUQUET (Shoesmith); PERFECTION (Shoesmith); TADBURN WHITE (Wills).

The following varieties have been deleted from the trials: COTSWOLD GEM; FELICITY, **A.M.** 1938; MAYLAND WHITE, **H.C.** 1939; SUCCESS; TIBSHELF WHITE, **A.M.** 1938.

FLOWERS CREAM

Shirley Cream (raised, introduced and sent by Mr. H. Woolman, Sandy Hill Nurseries, Shirley, Birmingham). **A.M.** August 28, 1947, as a disbudded variety for cutting and garden decoration. 3 feet. Plant of compact, erect habit with 18-inch long flower stems. Flowers double, incurved, $5\frac{1}{2}$ inches diameter, very pale cream.

The following variety has been retained for future judgment: CREAM DUCHESS (Johnsons).

The following varieties have been deleted from the trials: CREAM FELICITY; VICTORIA.

FLOWERS YELLOW

Flavius (raised, introduced and sent by Mr. H. Shoesmith, Mayford, Woking, Surrey). **A.M.** August 28, 1947, as a disbudded variety, for cutting and garden decoration. Described *R.H.S. JOURNAL*, 72, p. 203 (**H.C.** 1946).

Yellow Corona (raised, introduced and sent by Messrs. J. & T. Johnson, Tibshelf, Derbyshire). **A.M.** September 10, 1947, as a disbudded variety, for cutting and garden decoration. A "sport" from 'Corona' with Aureolin (**H.C.C.** 3) flowers.

Yellow Spur (raised, introduced and sent by Mr. H. Lowe, Vicar Lane Nurseries, Tibshelf, Derbyshire. **H.C.** August 7, 1947, as a spray variety. $1\frac{3}{4}$ feet. Plant of compact, bushy habit with 8- to 10-inch long flower stems. Flowers in spray form $3\frac{1}{2}$ inches diameter, double, Aureolin (**H.C.C.** 3/1).

The following varieties have been retained for future judgment: ALFRETON YELLOW (Riley); BALCOMBE GLORY (Shoesmith); GOLDEN DAWN (Johnsons).

The following varieties have been deleted from the trials: LILLIPUT LINNET; MRS. IRENE TORRANCE, **A.M.** 1939; PEVERIL, **A.M.** 1939.

FLOWERS AMBER

Radar (raised, introduced and sent by Messrs. J. & T. Johnson, Tibshelf, Derbyshire). **F.C.C.** August 7, 1947, as a disbudded variety for cutting and garden decoration. Described *R.H.S. JOURNAL*, 72, p. 203 (**A.M.** 1946).

Amber Vale (raised, introduced and sent by Messrs. J. & T. Johnson, Tibshelf, Derbyshire). **A.M.** August 7, 1947, as a disbudded variety for cutting and garden decoration. $2\frac{1}{2}$ feet. Plant of compact, bushy habit with 20- to 22-inch long flower stems. Flowers double, 5 inches diameter, Saffron Yellow (**H.C.C.** 7), inner florets Indian Yellow (**H.C.C.** 6/1).

Charter (raised, introduced and sent by Mr. H. Woolman, Sandy Hill Nurseries, Shirley, Birmingham). **A.M.** September 10, 1947, as a disbudded variety for cutting and garden decoration. 3 feet. Plant of compact habit with 22-inch long flower stems. Flowers 6 inches diameter, double, peach-buff shaded bronze.

Golden Bloom (raised by Messrs. H. Shoesmith Ltd., introduced and sent by Messrs. A. G. Vinten Ltd., Oldland Nursery, Balcombe, Sussex). **A.M.** August 28, 1947, as a disbudded variety for cutting and garden decoration. 3½ feet. Plant of compact habit with 30-inch long flower stems. Flowers double, 6 inches diameter, Cadmium Orange (H.C.C. 8) flushed golden amber.

The following varieties have been deleted from the trials: **ALFRETON BEAUTY**, **A.M.** 1942; **CHAFFINCH**, **A.M.** 1943; **MARIGOLD**, **A.M.** 1941; **TREASURE**.

FLOWERS OF PINK SHADES

Dorothy Vernon (raised, introduced and sent by Messrs. J. & T. Johnson, Tibshelf, Derbys.). **A.M.** August 28, 1947, as a disbudded variety for cutting and garden decoration. 2½ feet. Plant of compact habit with 18- to 22-inch long flower stems. Flowers double, 4½ inches diameter, Rose-pink (H.C.C. 427/2), inner florets with a light gold reverse.

Hyde (raised and sent by A. B. Hyde, Esq., Caet-Glow, Tile Lane, Adel, Leeds). **A.M.** August 28, 1947, as a spray variety. 2½ feet. Plants of compact habit, with 18- to 24-inch flower stems. Flowers double, 3 inches diameter, Phlox Pink (H.C.C. 625/3) suffused with amber.

Lily Lambert Sweetheart syn. **Pearl Sweetheart** (introduced and sent by Mr. C. P. Ward, Bridge Bank, Walton-le-Dale, Preston, Lancs.). **A.M.** August 7, 1947, as a disbudded variety for cutting and garden decoration. Characters of 'Sweetheart' from which it is a "sport". Flowers Orient Pink (H.C.C. 416/3) shaded pale amber.

Margaret (raised, introduced and sent by Messrs. J. & E. Maher, Carisbrooke Nurseries, South Road, Oak Avenue, Hampton, Middlesex). **A.M.** September 10, 1947, as a disbudded variety for cutting and garden decoration. 2½ feet. Plants of bushy, compact habit with 22- to 24-inch long flower stems. Flowers double, 5 inches diameter, Roseine Purple (H.C.C. 629/2).

Day Dream (raised, introduced and sent by Messrs. J. & T. Johnson, Tibshelf, Derbys.). **H.C.** August 28, 1947, as a disbudded variety for cutting and garden decoration. 2½ feet. Plant of compact habit, with 12- to 20-inch long flower stems. Flowers double, 4½ inches diameter, Dawn Pink (between H.C.C. 523/2 and 523/3), inner florets tipped with gold.

The following variety has been retained for future judgment: **BETTY RILEY** (Riley).

The following varieties have been deleted from the trials: **COTSWOLD MARVEL**; **DIANE**; **MADELINE**; **ROSSLYN PINK**.

FLOWERS OF ROSE SHADES

Sweetheart (raised, introduced and sent by Messrs. J. & T. Johnson, Tibshelf, Derbys.). **F.C.C.** August 7, 1947, as a disbudded variety, for cutting and garden decoration. Described *R.H.S. JOURNAL*, 70, p. 33 (**A.M.** 1944).

Freda Pearce (raised, introduced and sent by Messrs. H. Shoesmith Ltd., Mayford, Woking, Surrey). **A.M.** August 28, 1947, as a disbudded variety, for cutting and garden decoration. 3 feet. Plant of compact, bushy habit with 20- to 24-inch long flower stems. Flowers double, 5 inches diameter, Roseine Purple (H.C.C. 629/1), inner florets tipped with gold.

The following varieties have been retained for future judgment: **LADYBOWER** (Johnson); **PATRICIA** (Lowe).

The following varieties have been deleted from the trials: **BERYL**, **A.M.** 1942; **DR. GEORGE BARNES**, **H.C.** 1943; **ROSE BOUQUET**.

FLOWERS OF SALMON SHADES

Barbara (raised, introduced and sent by Messrs. H. Shoesmith Ltd., Mayford, Woking, Surrey). F.C.C. September 10, 1947, as a disbudded variety, for cutting and garden decoration. Described R.H.S. JOURNAL, 68, p. 91. (A.M. 1942).

Mary Mona (raised, introduced and sent by Messrs. H. Shoesmith Ltd., Mayford, Woking, Surrey). F.C.C. September 10, 1947, as a disbudded variety for cutting and garden decoration. Described R.H.S. JOURNAL, 69, p. 209 (A.M. 1943).

Christine Sweetheart (introduced and sent by Mr. J. E. Marsland, Clay Lane Nursery, Timperley, Cheshire). A.M. August 7, 1947, as a disbudded variety for cutting and garden decoration. Characters of 'Sweetheart,' from which it is a "sport." Flowers Claret Rose (between H.C.C. 021/1 and 021) with bronzy shading and an old gold reverse.

The following varieties have been retained for future judgment: SALMON-CERISE SWEETHEART (Johnson), too much like 'EGERTON SWEETHEART'; SMILES (Shoesmith).

The following variety has been deleted from the trials: SWEET SUE.

FLOWERS OF ORANGE-BROWN SHADES

Arnhem (raised, introduced and sent by Messrs. J. & T. Johnson, Tibshelf, Derbys.). F.C.C. August 28, 1947, as a disbudded variety for cutting and garden decoration. Described R.H.S. JOURNAL, 72, p. 204 (A.M. 1946).

Bronze Sweetheart (introduced and sent by Messrs. J. & T. Johnson, Tibshelf, Derbys.). A.M. August 7, 1947, as a disbudded variety for cutting and garden decoration. Characters of 'Sweetheart' from which it is a "sport." Flowers rich golden-orange overlaid reddish-bronze.

Cotswold Bronze (raised by Messrs. H. Shoesmith Ltd., Mayford, Woking, Surrey, introduced and sent by Messrs. Greenyer Bros. Ltd., Broadwater Green Nurseries, Worthing, Sussex). A.M. September 30, 1947, as a disbudded variety for cutting and garden decoration. 3 feet. Plant of compact, bushy habit with 38-inch long flower stems. Flowers double, 5½ inches diameter, rich bronze, inner petals chestnut-bronze.

Redbreast (raised, introduced and sent by Mr. H. Woolman, Sandy Hill Nurseries, Shirley, Birmingham). A.M. September 30, 1947, as a dwarf, spray variety for garden decoration. 12 inches. Plant of compact, bushy habit. Flowers semi-double, 2 inches diameter, Aureolin (H.C.C. 3) overlaid with Scarlet (H.C.C. 19/1) giving a bright brick-red effect. Suitable for edging or bedding.

The following varieties have been deleted from the trials: HONEYBIRD; MIRANDA; OCEANIC; PHEASANT; TIBSHELF GLORY, A.M. 1941.

FLOWERS OF REDDISH-BRONZE SHADES

Carefree (raised and introduced by Messrs. J. & T. Johnson and sent by Messrs. A. G. Vinten Ltd., Oldland Nurseries, Balcombe, Sussex). F.C.C. September 30, 1947, as a disbudded variety for cutting and garden decoration. 3 feet. Plant of compact habit, with 22-inch flower stems. Flowers double, 5½ to 6 inches diameter, chestnut-bronze with a gold reverse.

Bronze Beauty (raised, introduced and sent by Messrs. H. Shoesmith Ltd., Mayford, Woking, Surrey). F.C.C. September 30, 1947, as a disbudded variety for cutting and garden decoration. Described R.H.S. JOURNAL, 64, p. 96 (A.M. 1938).

The following varieties have been retained for future judgment: BULWARK (Johnson); FLAMING TORCH (Shoesmith).

The following varieties have been deleted from the trials: BUBBLES; CARNIVAL, A.M. 1939.

FLOWERS OF RED SHADES

Sparkler (raised, introduced and sent by Messrs. J. & T. Johnson, Tibshelf, Derbys.). F.C.C. August 28, 1947, as a disbudded variety for cutting and garden decoration. Described R.H.S. JOURNAL, 72, p. 205 (A.M. 1946).

The following variety has been retained for future judgment: **GLADIATOR** (Woolman), F.C.C. 1944.

The following variety has been deleted from the trials: **VALIANT**, F.C.C. 1944.

AWARDS TO DELPHINIUMS AFTER TRIAL AT WISLEY

Delphinium 'Blackmore's Blue' (raised, introduced and sent by Messrs. Blackmore & Langdon, Bath). A.M. June 25, 1947. 5½ feet. Plant vigorous, free flowering. Flower spikes 2½ feet long, tapering with few side spikes. Flowers semi-double. 2½ inches diameter, French Blue (H.C.C. 43/1) slightly flushed with Mineral Violet (H.C.C. 635/2); eye white.

Delphinium 'Gremlin' (raised and sent by Mr. F. A. Bishop and introduced by Messrs. Bakers, Codsall, nr. Wolverhampton). A.M. June 25, 1947. 4 feet. Plant vigorous, compact habit. Flower spikes 1½ feet long, cylindrical, with few side spikes. Flowers semi-double, 2 inches diameter, Cobalt Blue (H.C.C. 44/1).

Delphinium 'Tessa' (raised, introduced and sent by Messrs. Blackmore & Langdon, Bath). A.M. June 25, 1947. 5½ feet. Plant vigorous, compact habit. Flower spikes 2 feet long, tapering, with few strong side spikes. Flowers semi-double, 2½ inches diameter, inner petals Cobalt Violet (between H.C.C. 634/2 and 634/3), outer petals flushed with French Blue (H.C.C. 43/2); eye white.

Mrs. T. Carlile (raised, introduced and sent by Messrs. T. Carlile (Loddon Nurseries) Ltd., Twyford, Berks.). H.C. June 25, 1947. 5½ feet. Plant vigorous. Flower spikes 2 feet long, tapering, with few side spikes. Flowers semi-double, 2½ inches diameter, outer petals Butterfly Blue (H.C.C. 645/3), inner flushed with Mineral Violet (H.C.C. 635/3); eye white, inconspicuous.

RUNNER BEANS AT WISLEY, 1947

Eight stocks of Runner Beans were received at Wisley for trial in 1947. These were sown in double rows, twelve inches apart, 5 feet separating the double rows, on May 27. The season was a difficult one in many ways and after a check due to the severe storm in mid July, the plants grew well and fruited freely.

The following varieties were grown for comparison with those submitted for trial: **CRUSADER**, **MARVEL**, **NE PLUS ULTRA**, **RAJAH**, **SCARLET EMPEROR** and **STREAMLINE**.

They were finally judged by a sub-committee of the Fruit and Vegetable Committee on September 11, who made their final decisions and recommendation for an Award, as given below.

SEEDS PURPLE WITH BLACK MARKINGS

Flowers Scarlet

PRINCEPS (Watkins & Simpson Ltd., Nutting & Sons Ltd.); **KELVEDON WONDER** (Nutting & Sons Ltd.); both of these varieties have smaller seeds, dwarfer and shorter pods than the following, primarily used for market use: **BEST OF ALL** (Sutton & Sons Ltd.); **SHEARN'S EXHIBITION** (A. R. Block).

SEEDS PURPLE WITH FEW BLACK MARKINGS

Flowers Scarlet

Prizewinner (raised, introduced and sent by Messrs. Sutton & Sons Ltd., Reading). **A.M.** September 11, 1947. Pods straight, 12 inches long, $\frac{3}{4}$ to 1 inch wide, borne in large clusters, 6 to 8 pods in a cluster, medium dull green of good quality. Crop heavy and continuous.

PRIZEWINNER SELECTION (Nutting & Sons Ltd.).

SEEDS WHITE

Flowers White

ERECTA (Piet van der Veld).

MAINCROP PEAS AT WISLEY, 1947

Twenty-three stocks of Culinary Peas were received at Wisley for trial in 1947; one row, 35 feet long, of each were sown on April 30, the rows being at a suitable distance apart according to the height to which they were expected to attain.

All the stocks made good growth. The following varieties were grown as standards for comparison: ADMIRAL BEATTY, ALDERMAN, BRITISH EMPIRE, DUPLEX, GIANT STRIDE, LORD CHANCELLOR, MIRACLE and ONWARD. The following variety was grown but proved to be a late maturing variety: DELICIOUS (Crane), 8 feet tall. The following unnamed seedlings were grown: SEEDLINGS Nos. 1, 2 and 5, (Nutting & Sons Ltd.), No. 20 (G. A. Bunting & Co.), MORSE'S No. 55 and HYBRID No. 101, earlies (Ferry-Morse Seed Co.). No further reference is made to them in the report.

The trials were inspected by a sub-committee of the Fruit and Vegetable Committee on July 25, 1947, who made their final decisions and recommendations for Awards, as given below.

1 TO 1½ FEET: Seed Round

CAMBRIDGE MULTIPOD (Allwood Bros. Ltd.).

Seed Wrinkled

MORSE'S MARKET (Merry-Morse Seed Co.), an early variety.

2 TO 3 FEET: Seed Wrinkled

DUPLEX (Nutting & Sons Ltd.); **ONWARD** (Nutting & Sons Ltd.); **PHENOMENON** (Sutton & Sons Ltd.).

3 TO 4½ FEET: Seed Wrinkled

Oracle (raised, introduced and sent by Messrs. Ferry-Morse Seed Co., San Francisco, California, U.S.A.). **A.M.** July 25, 1947. Vigorous, 4½ feet; haulm medium green; pods single, straight, blunt, 4½ inches long, medium green; peas large, bright green, 7 or 8 in a pod; crop heavy. A very true and level stock.

Majestic (raised, introduced and sent by Messrs. Sutton & Sons Ltd., Reading). **H.C.** July 25, 1947. Vigorous, 4 feet; haulm medium green; pods single, pointed, curved, dark green, 5½ to 6 inches long; peas large, bright dark green, 8 in a pod; crop fair.

ARISTOCRAT (Nutting & Sons Ltd.); **BEST OF ALL** (Sutton & Sons Ltd.); **PEERLESS** (Sutton & Sons Ltd.).

OVER 4½ FEET: Seed Wrinkled

Miramar (raised, introduced and sent by Messrs. Ferry-Morse Seed Co., San Francisco, California, U.S.A.). A.M. July 25, 1947. 5 feet. Haulm vigorous, medium green heavy; pods single, blunt, straight, medium green, 4½ inches long; peas large, bright green, 8 in a pod; crop heavy. A true and even stock.

Feltham Special (raised, introduced and sent by Messrs. Watkins & Simpson Ltd., 27 Drury Lane, Covent Garden, London, W.C. 2). A.M. July 25, 1947. 5 feet. Haulm vigorous, medium green, heavy; pods single, blunt, straight, medium green, 4 inches long; peas large bright green, 6 or 7 in a pod; crop heavy. A taller and earlier type of 'Onward.' A true and level stock.

ADMIRAL BEATTY (J. L. Clucas Ltd.); ALDERMAN (Ferry-Morse Seed Co.); EMERALD (J. L. Clucas Ltd.); ORMSKIRKIAN (J. L. Clucas).

BOOK NOTES

"The World grows round my Door." By David Fairchild. (Charles Scribner's Sons Ltd., London.) 347 pp. Illus. 21/—.

Readers who enjoyed David Fairchild's fascinating book, *The World was my Garden* will welcome his latest volume. Few writers on plants and plant collecting can hold the reader's attention as can this writer. As he takes us round his semi-tropical garden in Florida we pause with him beside the *Bombax malabaricum* to watch "the countless little birds which are drinking from the great red flowers"; in passing he draws our attention to the Zulu Poison Arrow tree growing beside the door of the living room, to the great yellow flowers of the Allamander rioting over the wall, to the blue and straw-coloured land crabs tumbling head over heels down the steps as they scuttle out of our way. As he talks he returns in memory to the lands from whence he brought his plants: the South Sea Islands, the Dutch East Indies, China, Japan, British Guiana, the Gold Coast, New Zealand, Australia, Ceylon and many others. The happily turned phrase, the vivid word pictures lure us on, page after page, and as we read one fact emerges above all others. Here is the unconscious revelation of a wonderful personality, a character to whom every experience of a long and full life, whether of fulfilment or of disappointment, has been of value. David Fairchild, famous botanist and explorer, makes no mention of the great work he has done for America by the introduction and subsequent hybridization of new and valuable grains and fruit, nor does he mention the many honours which have been awarded him in recognition of his work. Rather he dwells on the happiness of his family life, the companionship of his friends, the interest of his garden and of his plants, and one is conscious of that serenity which comes only to those whose life has been spent in working at that which they love above all else.

Many of the 127 illustrations which add to the interest of this absorbing book are from photographs taken by the author. These are fully captioned but one could wish that they had been linked up with the letterpress by page numbers, but as 17 pages are devoted to an exhaustive index this is possibly a carping criticism.

GWENDOLYN ANLEY

"The Fruit and the Soil." Collected Edition of the John Innes Leaflets. Edited by Cyril D. Darlington. 62 pp. Ill. (Oliver and Boyd, Edinburgh & London.) 3s. 6d.

This useful little publication brings together five leaflets issued separately during the war by the John Innes Horticultural Institution, "To put the grower, the gardener and seedsman into touch with the latest results of research." Of these over 60,000 copies were sold, which is good evidence of the need for up-to-date and reliable information on the subjects they cover. A sixth leaflet on "Growing Pure Seed" has been added to this collection. The original five deal with "Composts and Soil Sterilization for Pot Plants," "Soil Ingredients of the Composts," "The Soil Steriliser" "The Fertility Rules in Fruit Planting" and "Growing Tomatoes Out of Doors." There is no need to recommend these well known and much appreciated leaflets. It is good to have them so conveniently available in a collected edition.

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7 JUN 1948

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Part 5

May 1948

THE SECRETARY'S PAGE

Chelsea Flower Show—The Chelsea Flower Show will be held in the Royal Hospital grounds on Wednesday, Thursday and Friday, May 26, 27 and 28. The hours for opening for Fellows and the price and hours of admission to the public are as follows:—

Wednesday, May 26.

- 8 A.M. to 8 P.M. Show open to Fellows, Associates and holders of Fellows' tickets.
1 P.M. to 8 P.M. Public admitted—entrance 10s.

Thursday, May 27.

- 8 A.M. to 8 P.M. Show open to Fellows, Associates and holders of Fellows' tickets.
12 noon to 8 P.M. Public admitted—entrance 5s.

Friday, May 28.

- 8 A.M. to 5 P.M. Show open to Fellows, Associates and holders of Fellows' tickets.
8 A.M. to 5 P.M. Public admitted—entrance 2s. 6d.

A circular has been prepared, and may be obtained on application to the Secretary, giving the official traffic arrangements, together with a map showing the parking places and the entrances to and exits from the Show grounds. These arrangements will be identical with those in force at the 1947 Show.

Fellows and Associates are also asked to note that self-propelled and invalid chairs cannot be admitted on Wednesday, May 26. On Thursday and Friday, May 27 and 28, they will be admitted between the opening hour and 12 noon on payment of 5s. for each chair, which covers one attendant.

Meetings in June—The followings Meetings and Shows will take place in the Society's Halls during the month of June:—

- { Tuesday, June 8—12 noon to 6 P.M.
- { Wednesday, June 9—10 A.M. to 5 P.M.
- { Tuesday, June 22—12 noon to 6 P.M.
- { Wednesday, June 23—10 A.M. to 5 P.M.

In connection with the first Show there will be a Pink Show, organized jointly by the British Carnation and the National Carnation and Picotee Society. Schedules may be obtained from the Hon. Secretaries of those Societies or from the Secretary of the Royal Horticultural Society. In connection with the Show on June 22 and 23 there will be a Flowering Tree and Shrub Competition, schedules for which may be obtained from the Secretary.

Lectures—On Tuesday, June 8, in the Lecture Room of the New Hall, PROF. T. WALLACE, C.B.E., M.C., D.SC., F.R.I.C., will deliver the first of two annual Masters Memorial Lectures, taking as his subject the Nutrition Problems connected with Horticultural Plants, with special reference to Trace Elements. On Tuesday, June 22, also at 3 P.M., MR. W. E. TH. INGWERSEN, V.M.H., will lecture on "Rock-garden Plants," in the Lecture Room.

Demonstrations at Wisley—The following demonstrations will take place at Wisley during May and June:—

Vegetable Garden.

Wednesday and Thursday, May 12 and 13.—Thinning, Transplanting and Successional Cropping (2-4 P.M.).

Flower Garden.

Wednesday and Thursday, June 2 and 3.—Summer Pruning of Shrubs (2-4 P.M.).

The demonstration to be given on the second day will be in both cases merely a repetition of that given on the first.

Wisley Gardens—For the convenience of Fellows visiting London for the Chelsea Show it has been arranged that on Sunday, May 23, and Sunday, May 30, the Society's Gardens at Wisley will be open at 1 P.M., instead of 2 P.M. which is normal Sunday opening time. The Gardens will be closed at 6 P.M. on each day as usual.

How to get to Wisley—Fellows and Associates desiring to travel to Wisley from London are reminded that the easiest method is to take the Green Line coach, No. 715, which passes through Oxford Circus at 7, 27 and 47 minutes past the hour *en route* for Guildford. The actual bus stop is not in Oxford Circus, but in Upper Regent St., opposite the Polytechnic. One should book to the Society's Gardens and ask to be put down at the turning on the Portsmouth Road leading to them. The Gardens are about five minutes' walk from that point. Alternatively, one can travel from Waterloo to Kingston and then by the Guildford bus, No. 215, which leaves the bus station about one

minute's walk from Kingston railway station. For particulars regarding the buses, inquiries should be made at the London Passenger Transport Board, 55 Broadway, London, S.W. 1 (Tel. ABBey 1234), and for the times of trains from Waterloo, the current time-table should be consulted or inquiries made at Waterloo Station (Tel. WATERloo 5100).

Gardens open to the public—The list of gardens open to the public in connection with the Queen's Institute of District Nursing is now ready and may be obtained on application to the Secretary, The National Gardens Scheme, Queen's Institute of District Nursing, 57 Lower Belgrave Street, London, S.W.1.

WISLEY IN MAY

THIS month provides the greatest floral display of the year in the Gardens, and it is not possible to mention in this short note all the shrubs now in flower. In the woodlands many Rhododendrons will be in full bloom, while the fresh green of the deciduous trees provides a delightful background for their many colours. Throughout the Gardens flowering Cherries and ornamental Crabs have been planted freely and these never fail to produce masses of delightful and often scented blossoms during the month.

Round the Laboratory several of the established wall-plants will be found in flower, including the climbing *Hydrangea petiolaris* on the east wall, Rose 'Belle of Portugal,' a blush-pink hybrid of *Rosa gigantea* which has greatly outgrown the alcove in which it was planted on the south side, *Clematis montana* var. *rubens*, generally covered with soft pink flowers, and a good white variety, *C. montana* var. *Wilsonii*.

The formal spring bedding at the top of the steps is now very fine, the colours of the Wallflowers and Tulips showing to great advantage against the new lawns surrounding the beds. Turning into the Floral Trial Grounds we see the grand patchwork effect of the herbaceous Lupins when planted together in beds of mixed colours; these are all named varieties and a useful reference list may easily be compiled for guidance in future planting by inspecting this trial.

Battleston Hill will be of great interest to all Rhododendron lovers and those Fellows who have been unable to visit the Gardens during the early part of the year will find the extensive new planting on the north side of the hill has added greatly to the attraction of this woodland. The established collection of popular hybrid Rhododendrons contains many fine plants, including such varieties as the crimson 'Earl of Athlone' F.C.C. 1933, 'Mrs. G. W. Leak' F.C.C. 1934, a delightful pink flower with darker spotting on the upper petal, 'Mrs. A. M. Williams' A.M. 1933, a rich carmine crimson, and the white, faintly spotted, 'Mount Everest.' On the crest of the hill, in the beds of Rhododendron species arranged in their series, will be found *Rhododendron Schlappenbachii*, a beautiful pale pink, *R. arboreum* in several shades of pink and red, the scarlet of *R. Thomsonii*, the pale yellow *R. caloxanthum*, *R. cyclium*, and many others; while near these the trial of deciduous Mollis and Ghent

Azealeas will be covered with flowers of many pastel shades of orange, yellow, pink, and copper, during the latter part of the month. Over the bridge, Magnolias are also in full flower, with several varieties of Kurume Azealeas, and small plants of some of the more recent hybrid Rhododendrons.

The newly-planted Cherry Field has few flowers to show, but most of the trees are growing freely and in a few years this will be one of the outstanding features of the Gardens.

Near the Rose Walk, the long border of hybrid Brooms will be in full flower during the latter part of this month; these plants become tall and gaunt with age and suffer considerable breakage from wind and snow, but if pruned back annually immediately after flowering they will remain shapely and escape much of this damage.

Flowering Cherries are also planted near the Roses, including the widely grown, rose-coloured, 'Kwanzan,' and 'Oku-miyako,' a late-flowering variety with long-stalked clusters of double white blossoms; also on the hill leading to the Alpine House will be found a selection of flowering Crabs, many with the dark flowers and foliage of *Malus purpurea*, such as *M.* 'Eleyi,' *M.* 'Oporto' and *M.* 'Lemoinei,' together with the green-leaved, double-flowered *M. magdeburgensis* and the early-fruited *M.* 'Frettingham Victoria.'

The trees and bushes in the Model Fruit Gardens, which are situated immediately behind the Cordon Pear Collection at the top of the Rose Walk, are now growing away well. These three small demonstration gardens were planted rather late in the spring of 1947, owing to the severe winter experienced that year. The following summer was extremely dry, but on the whole growth was quite satisfactory.

These fruit gardens are intended to show the amateur what types of trees and bushes can be planted in a restricted area and it is not necessary therefore to copy the lay-out exactly. It should be borne in mind that the stone fruits which are planted 12 × 12 feet are far too close together for a permanent planting, and that ultimately alternate trees will be removed. Similarly in the smaller plot, whilst it is considered that the bush Apples on Type M.VII rootstock are not too close together on the poor sandy soil concerned, on a richer soil, and at the same planting distance (10 × 12 feet), it would be more advisable to use Type M.IX rootstock.

An angle-iron and wire framework is to be erected to provide support for the cordon Apples and Pears. Also, an 8 feet structure of similar type is to be placed round the whole area. The latter will make it possible to demonstrate the training of fan-trained, espalier and similar fruit trees.

The Alpine House contains many plants in full flower, amongst them the arching sprays of *Saxifraga Cotyledon*, several of the *Lewisia*s noted previously, the spiny grey-green mounds of *Erinacea Anthyllis* set with mauve pea-flowers, *Dianthus simulans* with large solitary pink blossoms and close turfs of pointed leaves, the yellow flowers and grey-green fern-like leaves of *Corydalis Wilsonii*, the free-flowering, blue *Houstonia coerulea*, and *Tulipa linifolia* with narrow undulating foliage and scarlet flowers.

In the Rock Garden flowers greet the visitor at every turn, many of them well-known and widely planted alpiners; Aubretias, Saxifrages, and Phlox in many varieties, Penstemons such as *P. Scouleri* and *P. Newberryi* with lilac and cerise flowers, Violas, the brilliant blue of *Lithospermum diffusum*, the trailing branches of *Cytisus kewensis* covered with primrose yellow flowers, and *Roscoea cauleoides* with Orchid-like blooms of the same shade.

On the margins of the ponds will be found many of the moisture-loving Primulas including the mauve *P. yargongensis* and many of the Candelabra section; while in the shallow water the double form of *Caltha palustris* is covered with golden yellow buttons; here also, near the Wistaria-covered bridge, is planted a drift of *Iris laevigata* whose first blooms will be opening towards the end of the month.

Passing into the Wild Garden, gay with extensive beds of Primulas, clumps of rose and white Trilliums and blue Meconopsis, we note the freely-produced drooping bells of Enkianthus, and the nodding white flowers of *Magnolia sinensis* and *M. Wilsonii* greatly enhanced by the ring of dark pink stamens in their centres. Near the latter a small tree of *Styrax japonica* is freely hung with white blossoms, and several semi-shrubby hybrids between *Paeonia lutea* and *P. Delavayi* produce their yellow, crimson-suffused, cup-shaped blooms, above fern-like foliage.

Beyond the Award of Garden Merit Collection, where *Viburnum Carlesii*, *Prunus Padus* var. *Watereri*, and *Malus baccata* are in flower, is the Azalea Garden, an old-established planting that never fails to provide an outstanding wealth of bloom at this season; while also in this section the Viburnum collection has many white and cream panicles to add to the display.

In Seven Acres the Japanese Cherries should still be in flower during the early part of the month; among the many other shrubs coming into flower, the white racemes of the Exochordas are very conspicuous, and several of their relatives, the Spiraeas, are also in bloom. In the Heath Garden the large bushes of *Erica arborea* var. *alpina* will be covered with scented white bells, while in the borders along the boundary many Berberis are decked with hanging panicles of yellow or orange blossoms. Amongst the small trees planted here is the peculiar graft-hybrid *Laburnum Adamii* with yellow, pink and mauve blossoms on the same tree, and *Magnolia cordata*, a rarely planted North American species, with upright soft yellow flowers during May and June.

Howard's Field is well worth the extra walk at this season when the large collection of Lilacs will be in full flower. Last year the display was outstanding and there is every sign that, given freedom from late frosts, the plants will again provide an outstanding feature in the Gardens.

RECENT DEVELOPMENTS IN THE CONTROL OF WEEDS

Professor G. E. Blackman

DEPARTMENT OF AGRICULTURE, UNIVERSITY OF OXFORD

(A lecture given on November 4, 1947. Dr. J. Ramsbottom, D.Sc., F.L.S., in the Chair)

I take it as axiomatic that a good lecture should have a well-knit body with a neat beginning and a tidy end. So I am going to start by stating that I cannot produce such a lecture, for the very simple reason that a very great many developments in weed control have taken place during the last six years. As a result, there are still a great many untidy ends, and the consequence is that I cannot put before you a coherent picture, but must present a bundle of assorted facts.

I must admit that I was going to open with a reference to the Garden of Eden and the evilness of the first weed, but the Chairman in his opening remarks has stolen some of my thunder. However, you may remember from your history books the slogan that WAT TYLER's followers shouted on their march to London, "When Adam delved and Eve span, who was then the gentleman?" Clearly delving Adam could not have remained a gentleman for long when he had to deal with the weed problem with only a primitive hoe. In this connection it is not fully realized how far the pattern of civilization has been dependent upon man's weapons against weeds. Take for example the civilization of the Aztecs and the Incas: their agriculture was a hoe agriculture, since they had not invented the plough. Therefore their weapons to deal with unwanted vegetation were so inadequate that they could not settle in the areas of America where there was a high rainfall, because under such conditions, with their hoes they could not clear the natural vegetation and start arable farming. Instead, they built their cities in semi-desert areas, where not only was there little natural vegetation to deal with but, once it had been removed, it took a long time to come back. To produce food under these semi-arid conditions, they had perforce to be skilled irrigation engineers in bringing water to their crops.

This same sort of pattern of civilization and agricultural practice still survives in the world to-day, especially among primitive races. In fact, it has not been sufficiently emphasized that from the time when the plough was invented up to half a century ago there were no radical changes in the techniques available for killing weeds. The great advance was initiated 51 years ago, when the Frenchman BONNET demonstrated that if you spray a crop of oats with a dilute solution of copper sulphate, then the yellow charlock growing in the oats is killed, but the oats remain undamaged. One would have thought that once this discovery had been made a great many other research workers would have settled down to examine systematically other compounds, to see what were their effects on weeds and crops: but nothing of the sort happened. Perhaps it was because there were other exciting things to do with chemicals. The questions of new insecticides, new fungicides and new

bactericides were all to the fore, and somehow herbicides did not come into the picture.

Perhaps, too, it was because the early attempts at improving on copper sulphate were not very promising. They, like copper sulphate, took a long time to act, or either they only killed a narrow range of weeds or they killed everything, and were not therefore selective in their action.

In fact, between 1896 and 1911 nothing new happened, and then another Frenchman, RABATÉ, demonstrated that, by spraying a cereal crop with dilute sulphuric acid, you could kill a large number of the dicotyledonous weeds without seriously injuring the crop. In fact, it was shown that, although shortly after spraying the injury to the crop looked serious, the initial injury was not reflected in the final yield. The great advantages of sulphuric acid were—firstly, that a wide range of weeds were killed and, secondly, that only roughly an hour of fine weather was demanded for effective action. In practice, rapidity of action is of great importance in the showery weather of spring, so that RABATÉ's discovery eventually led to as much as half a million acres of cereals in France being sprayed with acid during the '30's. However, it was not until 1932 that the first experiments were undertaken in Great Britain, and then these experiments showed that sulphuric acid was equally effective against weeds in British cereal crops.

There are, of course, obvious disadvantages about using sulphuric acid. It is a corrosive substance. It may be recalled that in old-fashioned melodrama the villain used it to threaten to spoil the beauty of the heroine with it. It can be equally destructive to clothing and metals, and if water is added to the acid and *not* the reverse way round so much heat may be generated that acid and steam are shot up into the air. Yet in spite of its dangerous properties few accidents to agricultural workers have been recorded. In fact this absence of accidents is largely due to the employment of the commercial 77 per cent. acid—that is, "B.O.V."—which is more foolproof, since less heat is generated if water is added by mistake the reverse way round.

The next important development took twenty years to come, and concerns a yellow dye stuff known as dinitro-ortho-cresol, or D.N.O.C for short. This compound was first synthesized in Russia in 1866, and still is to-day an excellent dye for silk. At one time it was put into butter and synthetic liqueurs to give the required colour, but the practice was given up because it was found to be toxic to human beings when swallowed. In 1932, nearly 70 years since its discovery, yet another two Frenchmen, TRUFFAUT and PASTAC, showed that by spraying cereals with this dye some of the weeds were killed, but the crop was not injured.

The next development in chronological order concerns copper compounds. To me it seems extraordinary that when BONNET in the '90's discovered copper sulphate, he and other workers did not immediately turn round and explore the possibilities of alternative cheap copper salts. In fact it was not until nearly forty-five years later that it was demonstrated by my research team that copper chloride was much more efficient than copper sulphate. It is not toxic to human

beings, it is not corrosive to clothes, but is in fact more corrosive to spraying machinery than the sulphuric acid.

Then, in 1940, came perhaps the most exciting discovery in recent years. That was the observation made by TEMPLEMAN that one of the growth substances—sometimes quite incorrectly called plant hormones—sprayed on to pots of oats in which there were some chance yellow charlock plants, killed the charlock but not the oats. The compound in question was alpha-naphthyl acetic acid, one of the materials used for making cuttings root faster. Since it was calculated from the pot tests that one would have to use about 25 pounds per acre of this expensive chemical to give a proper kill, a search was started to discover more active compounds of the growth substance type. At the end of 1942, two very active substances had been selected by tests both in the laboratory and in the greenhouse. These are—and I cannot apologize for their long names because they are complicated compounds—2-methyl-4-chloro-phenoxyacetic acid and 2-4-dichloro-phenoxyacetic acid, which we can readily abbreviate to M.C.P.A. and D.C.P.A.

TABLE I

The Inter-relationship between the Toxicity of the Herbicide and the Species.
Percentage Kill at Varying Spray Concentrations

	Goosegrass*		Corn Poppy		Shepherd's Needle		Scentless Mayweed	
	Conc.†	Kill %	Conc.	Kill %	Conc.	Kill %	Conc.	Kill %
Sulphuric acid . . .	9.2	50	9.2	9	9.2	16	9.2	16
	13.8	94	13.8	58	13.8	6	13.8	32
	18.4	95	18.4	52	18.4	18	18.4	55
Copper chloride . . .	1.0	26	0.5	0	0.5	33	2.0	25
	2.0	66	1.0	0	1.0	0	4.0	36
	4.0	83	2.0	19	2.0	0	6.0	40
Dinitro-ortho-cresol .	0.3	10	0.28	94	0.3	53	0.3	49
	0.6	74	0.55	91	0.7	49	0.6	85
	0.9	78	1.10	98	1.1	64	0.9	86
Methyl-chloro-phenoxy-acetic acid . . .	0.1	0	0.05	63	0.05	96	0.2	37
	0.2	0	0.15	86	0.15	100	0.4	40
	0.4	0	0.45	98	0.45	100	0.6	46

* Goosegrass = *Galium aparine* ; Corn Poppy = *Papaver rhoeas* ; Shepherd's Needle = *Scandix pecten-veneris* ; Scentless Mayweed = *Matricaria inodora*.

† All concentrations expressed on a weight-volume basis.

In order to illustrate how much the effectiveness of any one herbicide is dependent upon the plant which is being sprayed, a few experimental results are set out in Table I. By comparison, it is seen that the relative efficiency of sulphuric acid, copper chloride, the dyestuff D.N.O.C. and the growth substance M.C.P.A. is quite different with the different weeds. In the case of goosegrass, the highest kill is achieved with sulphuric acid, while contrariwise M.C.P.A. is the best for shepherd's

needle. Then again D.N.O.C. is most toxic to scentless mayweed, but D.N.O.C. shares with M.C.P.A. the honours for the control of corn poppy.

Another trend to notice in the table is the progressive fall in the amount of material required with the new herbicides. With sulphuric acid the concentration range of 9.2 to 18.4 per cent. contrasts with 0.1 to 0.4 for M.C.P.A. D.N.O.C. is not a long way behind M.C.P.A. in activity, while copper chloride is a halfway house.

I want now to come back again to sulphuric acid, because there have been some new developments in the use of sulphuric acid during the war. One of these uses is for weed control in onions and leek crops. The reason why sulphuric acid can be used in onions is because onions have the same habit of growth as a cereal. In both instances the leaves are waxy and they are also upright. Moreover, the growing tissues are basal and protected by the leaf sheaths. Thus the wax prevents penetration, the droplets run off the leaves and the meristems do not come in contact with the spray. On the other hand, most dicotyledonous weeds have flat waxless leaves, which catch the spray, while the growing point is exposed and vulnerable, since it is at the apex of the shoot.

TABLE II

Effects of Single and Double Spraying with Sulphuric Acid on the Yield of Onions

Experiment	Yield of Onions—tons per acre				
	Not sprayed hand weeded	Sprayed once		Sprayed twice	
		acid	acid and wetter	acid	acid and wetter
1	4.67	5.37	5.61	5.28	5.19
2	4.86	4.82	4.46	5.33	5.38
3	6.55	7.20	8.42	9.04	6.11
4	8.59	9.66	6.86	7.06	4.95
5	10.23	8.72	6.84	4.94	6.59
6	14.23	13.92	12.14	13.45	12.57
7	23.66	23.53	21.53	21.76	20.30
Mean	10.40	10.46	9.41	9.27	8.73

Some of the results for the investigations on onions are shown in Table II. In the first column are the yield results from the plots in which the weeds, in keeping with tradition, have been removed by hand. In the second column are the comparable yields where the onions have been sprayed with acid at the time when the plants have "straightened up" but are still only two or three inches high. Note there is no mean difference in yield between the sprayed and the hand weeded plots. If a wetting agent is added (you may have to do this for some of the types of weed present, like knotgrass), then there is on average a slight reduction in yield. In seasons when there is a second crop of weeds the onions may be sprayed again when they have five to six leaves. Under these circumstances there is a slight reduction in yield

for the double spraying, about 11 per cent. If a wetting agent is used, the reduction is larger—16 per cent.

As a gardener you may not think that spraying is worth while. Maybe it is not, but in the early stages of the war, when a decision had to be made to increase the onion acreage twentyfold, it would have been quite impracticable to have done this without the substitution of acid spraying for hand weeding. To-day the really large onion grower uses sulphuric acid for the elimination of weeds, since it pays handsome dividends. Without spraying, the labour to "crawl" the rows is just not available.

Arising out of this research comes a question which is still controversial. There has always been a strong tradition that onions ought to be hoed. It is not so much the belief that hoeing is needed to kill the

TABLE III

The Effects of Hoeing and Acid Spraying on the Yield of Onions

Treatment	Relative Yield				
	Slough		Iver		mean
	1943	1944	1943	1944	
Hand weeded and hoed	100	100	100	100	100
Hand weeded, not hoed	94	106	102	95	99
Sprayed and hoed	81	85	84	104	88
Sprayed, not hoed	78	90	83	110	90

In each experiment the average yield of the plots which have been hand weeded and hoed in the normal way has been taken as 100.

weeds but that hoeing is essential for the sake of the onions. Now, if you can get rid of the weeds cheaply by sulphuric acid, does it pay you to go on hoeing the crop? From the results set out in Table III it is clear that there is little advantage from hoeing, as long as the weeds have been removed by spraying. In other words, the belief that hoeing for hoeing's sake is necessary in onion crops must go by the board. I want to make it very certain that I am *not* suggesting that this is *invariably* true. All these experiments were carried out on Thames gravel, but onions are grown on all sorts of soils, including the heavier loams, where the soil cracks wide open in mid-summer if there is a dry period. On such soils it may be that hoeing, by closing up the cracks, is beneficial, because otherwise water will evaporate from the deeper layers by way of the cracks; but in the gravel soils around London hoeing is probably not an economic proposition.

I want now to go back to these growth substances, because the variability of the effects demonstrates some of the complexities of trying to apply our results to the thousands of species which grow in gardens. For example, if you determine the concentration which is required to kill the germinating seed of a particular species and then spray the same concentration when the plant is in the cotyledon, seedling, pre-flowering or flowering stage, the results may be extremely conflicting. With yellow charlock there is an equally good kill at all

stages of growth from germination to flowering, but with poppies, though the seedlings may be killed, the flowering plants will be completely resistant. Again, while germinating cereals are susceptible, established tillering plants are resistant. Similarly, linseed and flax reach a resistance stage by the time they are 3-4 inches high. Thus for each crop and for each weed there is an optimum time to spray.

Little imagination is required to compute that to establish all the factors involved for all garden plants and all compounds is a Herculean task that will take several decades. There should therefore be no surprise that at question time I shall keep on saying "I don't know."

For some weeds, however, the information is more complete. For instance, the growth substance, M.C.P.A., is highly toxic to creeping buttercup. Using a rate of three pounds to the acre, nearly a complete kill can be obtained from treatment in the spring, but results later in the season are not so good.

TABLE IV

The Effects of Varying the Rate and Number of Applications of M.C.P.A. on the Destruction of Lawn Weeds

Frequency and Percentage Concentration of Spray*	Percentage kill	
	Daisy (<i>Bellis perennis</i>)	Plantain (<i>Plantago media</i>)
Single Application (April) { 0.1 0.2 0.3	61.5 70.0 62.0	69.3 79.0 80.0
Double Application (April and June) { 0.1 0.2 0.3	78.7 70.2 90.3	98.9 98.9 100.0
Triple Application (April, June and August) { 0.1 0.2 0.3	82.6 99.4 98.5	98.9 100.0 97.3

* The spray at 0.1, 0.2 and 0.3 per cent. concentration is equivalent to applications at the rate of 1, 2 and 3 pounds per acre of M.C.P.A.

Creeping buttercup is a troublesome weed on lawns, and it is of interest to discuss what other weeds can be suppressed by the growth substances. Our results do not agree with the recommendation that the best treatment is one large dose in the spring. Quite the contrary, a smaller concentration repeated at four to six weekly intervals is more effective. In support of this claim, the results of one of the experiments are shown in Table IV. For both daisies and plantains three applications at one pound per acre are more successful than a single application of three pounds.

Even these repeated applications will not kill all the weeds in the lawn—yarrow (*Achillea millefolium*) for example—but nevertheless the growth substances are a great improvement over previous methods. Moreover, the action of these new herbicides is very slow and it may be a month or more before the plants die or recover. Repeated applications are effective because they prevent the recovery of injured plants.

As I have already stressed, there has been no time as yet to evolve successful techniques for most of the vegetable crops. Unfortunately, D.N.O.C. and the growth substances kill most of the common vegetables such as the cabbage family, beets, turnips, carrots, parsnip, onion, shallots, leeks, peas and beans. By the time all these have been eliminated, there is not a great deal left in the kitchen garden! Something can be done, however, about creeping thistle and bindweed in the asparagus bed. It may not be difficult to keep these weeds down in the garden, but where asparagus is grown commercially on the lighter soils such weeds can be a very serious problem. It is essential to wait until the "fern" is 4-5 feet high. At this stage you can just get down between the beds with a knapsack sprayer and spray the weeds with either of the growth substances M.C.P.A. or D.C.P.A. A complete control at a single application cannot be expected, but there should be a good reduction.

There is another point about waiting until the "fern" has reached a good height. After cutting is stopped, no attempt should be made to hoe the bindweed or pull the thistle in the interval because, if they are sprayed when the shoots are a few inches high, the control may be negligible. Whereas annuals must be sprayed as seedlings, yet when it comes to some perennials you must delay spraying until the flower buds can be seen. Fortunately, in asparagus, by the time the "fern" has reached full height, this coincides with the best stage of development for the greatest kill of thistle and bindweed.

Now I want to consider another new development—that is the possibilities of selective weed control in crops like parsnips and carrots, by means of light mineral oils of the kerosene or "white spirit" type. Do not imagine you can go back to the kitchen garden, take some paraffin and spray the carrots. You might kill the weeds and the carrots, or you might be lucky and only kill the weeds! At the present time, there are no exact facts on which to base any selection of a suitable kerosene. The only effective test is to try.

In Great Britain we are handicapped because kerosenes are imported from many parts of the world and bulk stored. In consequence the consignments get mixed up, whereas in the States, where the use of mineral oils for weed control in carrots has gone a long way, there are local oil wells with refineries from which standard grades of kerosene can be guaranteed once they have been proved suitable. That is what we hope eventually to achieve in Great Britain. At the present moment we are experimenting with samples of kerosene from different sources, for which in the future bulk quantities can be produced if necessary. Then again, kerosene at 80 or 100 gallons per acre is not cheap, but carrot growers assure me it will be worth it.

In other parallel investigations we are trying to find out what is the constituent in the kerosene which is effective. Those of you who have any chemical knowledge will know that this is a formidable problem. We may have a very lucky break, or maybe twenty years hence we may not yet know the answer, because in any mineral oil there are scores of known, and as yet unknown, compounds.

Having discussed some of the latest developments, the question

arises, What can be done in the garden about the weeds? As the growth substances are now generally available, the recommendations are that lawns can be treated, but do remember how toxic are these substances and avoid the flower beds. May I ram this point home by stating that as little as two ounces per acre under favourable conditions will kill yellow charlock, and some other plants are nearly as sensitive. Therefore it is absolutely essential to clean the sprayer or watering can very thoroughly after you have applied the weed killer to the lawn. Otherwise, if you start spraying or watering crops like tomatoes, the results will be astonishing—and disastrous.

Although sulphuric acid has a place in commercial horticulture, there is not much scope in the garden because special equipment is needed. Copper chloride, since it is easier to handle, can be employed for weed control in onions, but unfortunately many of the annual weeds killed by sulphuric acid are resistant to copper chloride.

To conclude this review of some of the things that have been accomplished up to the present time, may I again stress that the picture is by no means complete. The high lights in the background are only a promise of things to come. The middle ground consists of developments which are on the way but have not yet arrived. In some parts of the foreground the detail is complete where developments have reached a stage of commercial application. But what I want to impress upon you is that as far as the garden is concerned most of the foreground is not filled in.

Chairman. We have listened with very great interest to PROFESSOR BLACKMAN. I am sure some of you will want to ask him questions, as he hinted in his lecture and has just confirmed that he will be quite pleased to try to answer them.

FIRST QUESTION. If I treated bindweed in rosebeds with one of the growth substances, would it kill my roses?

Professor Blackman. This is exactly the kind of question I am afraid I cannot answer, because not enough research has yet been done on the effects of these growth substances on woody plants. According to the American workers, some species are resistant and others susceptible. In this country we have, as yet, had no time to investigate the control of weeds in rosebeds. "First things must come first", and during the war, and even now, we are concentrating our efforts on weed control in agriculture. The only suggestion I can make is that you try, but only on one or two roses. I won't be surprised if different rose species respond in different ways.

SECOND QUESTION. What would you suggest for dandelions on the lawn?

Professor Blackman. The growth substances are pretty effective at one pound per acre, with perhaps two or three applications at six weekly intervals, starting in April. Such a treatment ought to eliminate well over 90 per cent. of the dandelions.

THIRD QUESTION. What time of year is the best time for dealing with the dandelion?

Professor Blackman. Start about the end of April with the first application, follow it up with a second in early June, and finally give a third dressing in the middle of July.

FOURTH QUESTION. Is reseeding needed after the weeds have been cleared?

Professor Blackman. This is a difficult question to answer precisely, since there are a number of factors involved. Unless the lawn before treatment consisted of more weeds than grasses, then no reseeding should be required since the grasses, especially if given some fertilizer treatment, should recolonize the areas left by the weeds. If, however, there are patches of bare ground which do not fill in, then it is possible to reseed once the after effects of the growth substances have disappeared. In warm and rainy weather, this period takes about six weeks, but in dry conditions it may be much longer. As an alternative, you can of course use the growth substances to clean up the seedbed before the actual grasses are sown. For example, if you are sowing your seed in the spring, then the seedbed should be treated as soon as the weed seeds put in an appearance, and the grasses can be sown about six weeks later. The evidence is that you can sow sooner after D.C.P.A. than M.C.P.A.

FIFTH QUESTION. Are these substances suitable for killing green moss on tennis courts?

Professor Blackman. Although we have not very precise information on this point, the evidence is that the mosses are not readily killed.

SIXTH QUESTION. Is there any evidence that turf which has been attacked by the disease *Fusarium* is more susceptible to the growth substances than healthy turf?

Professor Blackman. I am afraid I do not know. In any case, the question of possible damage to turf by the growth substances is a complex one. In America the general recommendation is that when the grass is growing very rapidly it is best to delay applications. On the other hand, there are other claims that the best results are achieved if the turf is given a dressing of a nitrogenous fertilizer before applying the growth substances.

SEVENTH QUESTION. Is M.C.P.A. selective among grasses?

Professor Blackman. Once the grasses are fully established, then there is little difference in their reaction to M.C.P.A. On the other hand, the reactions of different species in the germinating phase is very distinct. For example, germinating seedlings of black grass or cocksfoot are much more readily killed than germinating seedlings of wheat. Nevertheless, although these differences are interesting from the academic point of view they, as yet, have no practical application.

EIGHTH QUESTION. Under my gooseberries, red currants and raspberries I have a magnificent crop of ground elder and bindweed. Can I use these growth substances?

Professor Blackman. We have only done experiments on black currants, and here we have found that the growth substances are far too damaging. The American evidence is that the growth substances are equally toxic to red currants and raspberries. In any case, ground elder is unfortunately one of the plants which are resistant to M.C.P.A. and D.C.P.A.

NINTH QUESTION. Can you use the growth substances in orchards for weed control?

Professor Blackman. Here again I am afraid I can only give a tentative answer because we have no actual research experience in this country. I would, however, point out that as the growth substances can be absorbed through the roots, there is the danger that they may be taken up by the roots of the fruit trees and so cause damage.

TENTH QUESTION. May we use copper chloride on garden plants? What type of selectivity has it?

Professor Blackman. Copper chloride can only be used on onion crops or leek seedbeds. It is not as effective as sulphuric acid, but it will kill some kinds of annual weeds. Copper chloride is now available commercially, but do not forget that it is excessively corrosive to metals and will ruin your sprayer or watering-can if it is left standing around with some solution left in it.

ELEVENTH QUESTION. I doubt if many of us have access to buying a pound or two of the pure growth substances. We must have made up products. You suggest we spread it over two or three applications, whereas on their directions they suggest one application. Must we weaken that? My grass cost me 40/- for one application.

Professor Blackman. Here, I am in a difficult situation since I am a University Professor and outside the commercial field. If the composition and concentration of the effective compounds are given on the tin, then the amounts can be worked out in terms of the pure compound. If the contents are not given, of course you cannot do so. All the public can do is to insist on the manufacturer putting on the tin what is inside.

TWELFTH QUESTION. Are these new herbicides being used in the tropics?

Professor Blackman. Yes: experiments are going on in many of the Colonies and in all parts of America. For example, very promising results have been obtained in the control of weeds in rice and sugar cane.

THIRTEENTH QUESTION. Is it easy to summarise the relative merits of M.C.P.A. and D.C.P.A. against lawn weeds?

Professor Blackman. We have not as yet enough evidence, since there are so many different weeds that occur on lawns and we have only accurate results for a few species. As a general statement, I should say that M.C.P.A. is a little more active than D.C.P.A.

FOURTEENTH QUESTION. Is there any cumulative after-effect in selective weed killers on the lawn?

Professor Blackman. No. Experiments have shown that there are micro-organisms in the soil, especially some moulds which attack

the growth substances, and as a result they are turned into harmless compounds within approximately six weeks, if the soil is moist and the temperatures high. For D.N.O.C. the decomposition is even more rapid.

FIFTEENTH QUESTION. Is there any substance that will kill everything and leave the ground free after six weeks for planting grass seed?

Professor Blackman. Nothing at present, but there may be something in the future.

SOME HERBACEOUS PERENNIALS

F. G. Preston, V.M.H.

(LATE SUPERINTENDENT UNIVERSITY BOTANIC GARDEN, CAMBRIDGE)

PART I

HERBACEOUS perennials and herbaceous borders have for many years formed an important part of the garden. This tendency has increased during the last half-century. We are greatly indebted to horticulturists, and particularly nurserymen, who have raised so many new varieties of plants which have provided such wonderful shades of colour for our gardens through so much of the year. I feel, however, there are many beautiful species which are sometimes overlooked, and many of these are worthy of a place in our borders. They will add variety to the many fine forms of Michaelmas Daisies, Heleniums, Delphiniums and such plants.

Acanthus mollis, a native of S. Europe, is a handsome plant with conspicuous foliage. During the summer it produces loose hairy spikes 3 to 4 feet high, composed of dull, rosy-white flowers each with a 3-lobed, 1-lipped corolla. The flowers are sessile in the axils of deeply-toothed bracts. The handsome leaves are free from spines, heartshaped in outline, 2 feet long, half as much wide and sinuately lobed. It should be grown in rich well-drained loam, in a sunny position, being readily increased by seed or by division or by root cuttings in early autumn or spring. (Fig. 46.)

Aconitum Carmichaelii. The Monkshoods or Wolfsbanes, are among the most decorative of our herbaceous plants. Some species begin to flower in June, or even earlier, while others come on in the autumn. At that season, *A. Carmichaelii*, a native of China, is one of the most conspicuous plants in the herbaceous border, sometimes lasting until the middle of November. Its tall erect stems 5 to 6 feet high, with attractive, much cut, divided, three-parted, dark green leaves bears large loose panicles of numerous, helmet-shaped flowers, that vary from pale blue to deep violet on different forms. There has been much confusion over the name of this plant; it has been known under the name of *A. Wilsonii* and has been figured in the *Botanical Magazine* t. 7130 under the name of *A. Fischeri*, a name that has been applied to a number

of species. The true *A. Fischeri* is a native of Kamchatka, Sakhalin Okhotsk region of the Far Eastern U.S.S.R. and is a different plant with small flowers.

Aconitum vulparia. The pale yellow Wolfsbane, not so tall and more slender than the previous species. Its racemes of yellow or whitish, helmet or elongated cone-shaped flowers, the mouth of which has a yellow pubescence, particularly at the margin, and the somewhat palmate coarsely toothed deep green leaves make it quite attractive during the summer. It is a native of Central Europe and is quite an old plant in this country, having been introduced over 120 years ago.

Monkshoods are readily increased by division in the autumn or spring but as they do not give of their best the first season, should be left undisturbed as long as possible. They all thrive in full sun, but the flowers last much longer when grown in partial shade. As most species of *Aconitum* contain the poisonous alkaloid aconitin, they should never be planted near the vegetable garden, or in children's plots; the flowers also contain some poison.

Amsonia Tabernaemontana, a N. American perennial 2 to 3 feet high, with terminal panicles of blue or bluish small star-shaped flowers during May and June. These are followed by Milk-weed-like follicles. The ovate to lanceolate, acuminate willow-like leaves, remain fresh most of the summer. These with the fruits attached are still decorative. This plant very much resembles and is sometimes confused with *Rhazya orientalis*, another member of Apocynaceae, a native of the Mediterranean region. The difference is chiefly botanical; in *Amsonia* the anthers are obtuse and the seeds truncate at each end, whereas in *Rhazya* the seeds are winged at each end, and the anthers are acute.

This plant succeeds in any good well-drained soil and is readily increased by seed or by division of root stock.

Anemonopsis macrophylla. This attractive, erect perennial, about 2 feet high, a member of Ranunculaceae, and the only member of its genus, is closely allied to *Cimicifuga*, differing chiefly in the somewhat Anemone-like flowers and shape of petals. The rather drooping waxy-white centred flowers are 1 to 1½ inches in diameter with concave dull purple sepals and pale lilac, strongly imbricated, erect petals, are borne in few flowered racemes during July. These are carried well above the glossy, much divided foliage, which is broadly triangular in outline and very deeply incised. It requires a rich, deep, cool, lime-free loam in a well-drained, warm, sheltered position with some shade, and can be propagated by division of the thick fleshy creeping rootstock either in early autumn or early spring. Seeds, when obtainable, should be sown as soon as ripe.

Artemisia lactiflora. This Chinese Composite, 4 to 5 feet high, is quite a useful herbaceous plant, with its fragrant pinnate leaves and branching panicles of creamy-white flowers produced during the late summer and autumn. It succeeds in any good garden soil and is easily increased by division. This is related to our British Mugwort, *Artemisia vulgaris*.

Asclepias tuberosa (American Butterfly Weed). A handsome perennial, 2 to 3 feet high with several short-peduncled umbels of very showy

bright orange flowers. The corolla segments are strongly reflexed, and, typical of the whole genus, have conspicuous horns or appendages, standing up between the corolla and stamens, forming a crown. A native of N. America where it grows along dry banks and stony, sandy fields. Increased by seed or by division of the horizontal root stock in the spring. An attractive border plant, but not happy in calcareous soil.

Asphodelus ramosus. A very pretty, hardy, fleshy-rooted Liliaceous perennial, from the Mediterranean region, producing during the summer, branching racemes up to 3 to 4 feet high, white star-shaped flowers, each springing from the axil of a lanceolate bract, each segment of the flowers having a red line down the centre. The sword-like basal leaves are sharply keeled beneath, deeply channelled above. Succeeds in light sandy soil. Increased by seeds or by division of the root, which should be carried out in early spring as growth is about to commence. (Fig. 47.)

Brickellia grandiflora (Tassel Flower). This little-known Composite is a native of the mountains of western N. America and is closely allied to *Eupatorium*. It grows 3 to 4 feet high with triangular cordate, coarsely toothed leaves and panicles of drooping tassel-shaped yellowish-white or pinkish flowers during the summer. Excellent for a moist shady border. Increased by cuttings and division.

Brunnera macrophylla. A plant of charm and interest, furnished during May and June with $1\frac{1}{2}$ -foot stalked, scorpoid cymes of many flowers, pink in the bud stage, dazzling sky blue when open with a striking resemblance to the Forget-me-not. The few triangular, heart-shaped, papery green basal leaves are rather coarse, the stem leaves very much smaller. It is quite suitable for the front of the border but appreciates some shade. Native of the Western Caucasus where it grows in woods and rocky banks. Readily increased by seed or by division. It has been known as *Anchusa myosolidiflora* and *Myosotis macrophylla*.

Campanula latifolia macrantha, sometimes known as *Campanula macrantha* is certainly one of the handsomest of the perennial Bell flowers and worthy of a place in any herbaceous border, or for naturalising in the wild garden. A plant with stout, stiff stems 3 to 4 feet high with loose spikes 8 inches or more long, of axillary, bluish-purple, solitary flowers, each about $2\frac{1}{2}$ inches long. It is a native of Russia and is successful in any good ordinary soil and readily increased by seed.

Centaurea macrocephala. A stout, stiff, erect plant $2\frac{1}{2}$ to 3 feet in height with large, solitary, yellow flowers 4 inches across; the upper part of the sub-globose calyx is scarious, rust-coloured and fringed, and in a way, quite ornamental above the leaves, which are somewhat serrate, gradually diminishing upwards to the base of the single terminal flower head. It can be increased by division, but is usually grown from seed. A native of Armenia. (Fig. 49.)

Chrysanthemum rubellum. This is certainly a first-class border plant, 2 to $2\frac{1}{2}$ feet high, branching as it grows, finally during September and early October, becoming a mass of sweet-scented flowers with pink ray florets and yellowish disk-florets, practically covering the leaves. The origin of this plant is uncertain; possibly it is a plant of garden origin, and may be a hybrid of *Chrysanthemum Zawadskii* var. *sibiricum* which



FIG. 42—*Magnolia Sprengeri elongata* at Bodnant, March 11, 1948



Photo, Roger Bevan

FIG. 43- -*Eriogonum himalaicum* at 10,600 ft in Kashmir (See p. 153)

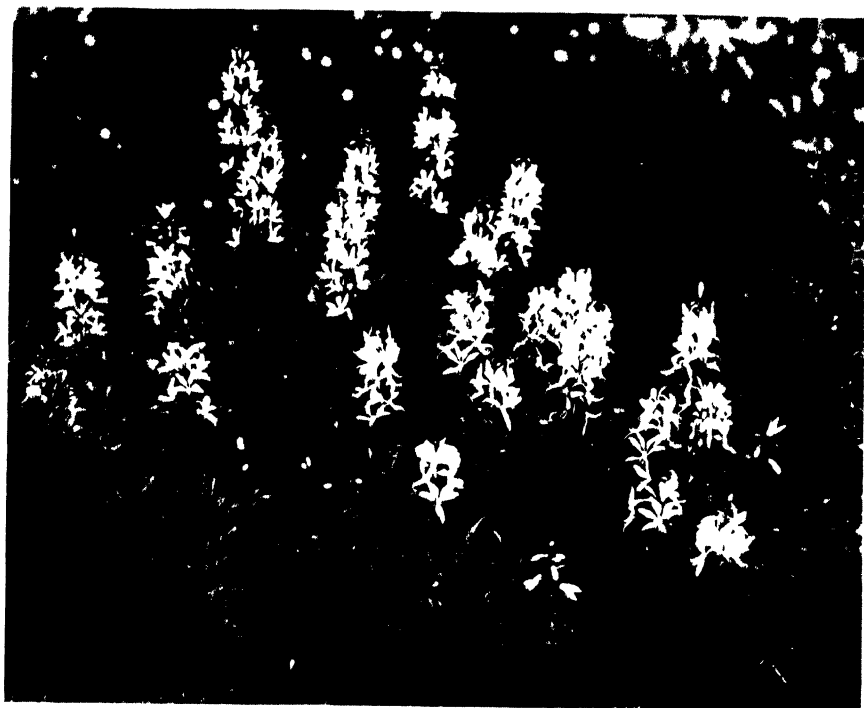


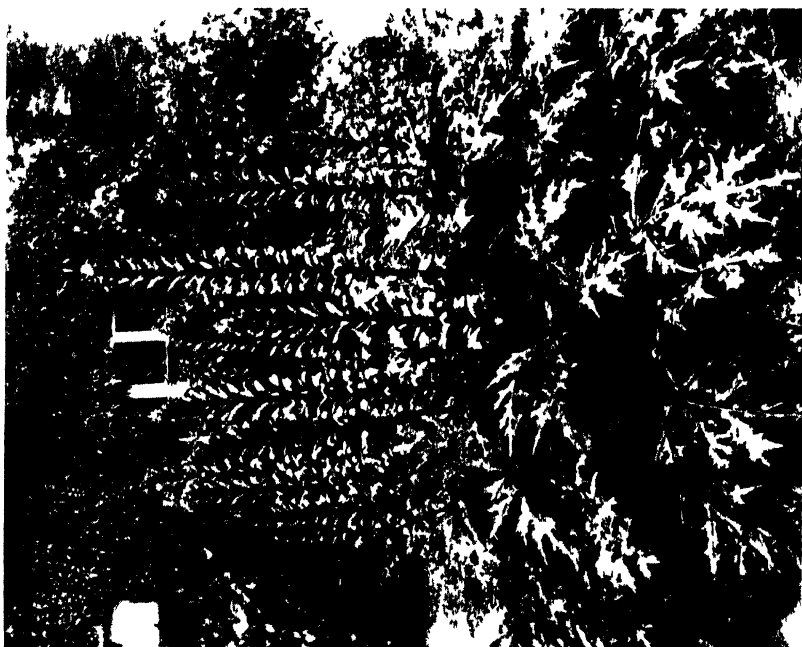
FIG. 44—*Dictamnus albus* (See p. 148)



Photos, Malby

SOME HERBACEOUS PERENNIALS

FIG. 45—*Euphorbia epithymoides* (See p. 149)



Photos, F G Preston

FIG 46—*Acanthus mollis* (See p 144)



FIG 47—*Asphodelus ramosus* (See p 146)



Photos, Malby

FIG 48—*Dicentra spectabilis* (See p 147)

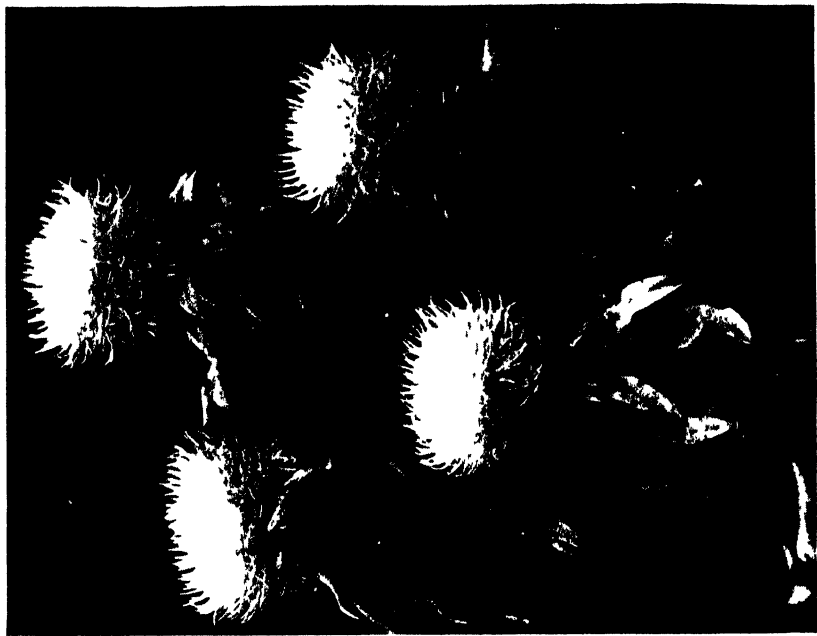


FIG. 49—*Centaurea macrocephala* (See p. 146)

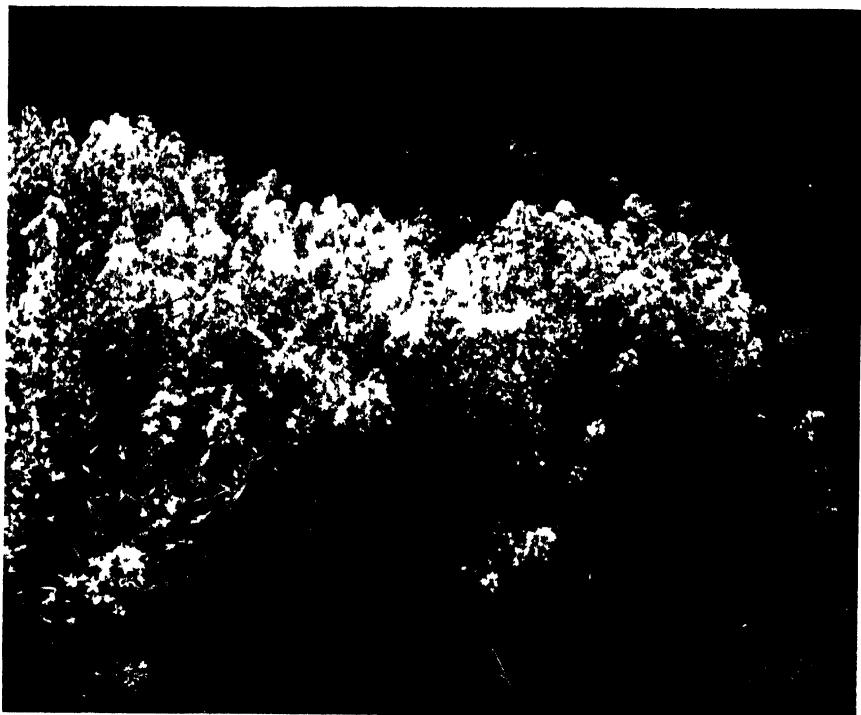


FIG. 50 —*Campanula lactiflora alba*



Photos, D. Wilkie

FIG. 51—*Celmsia major* (See p. 152)

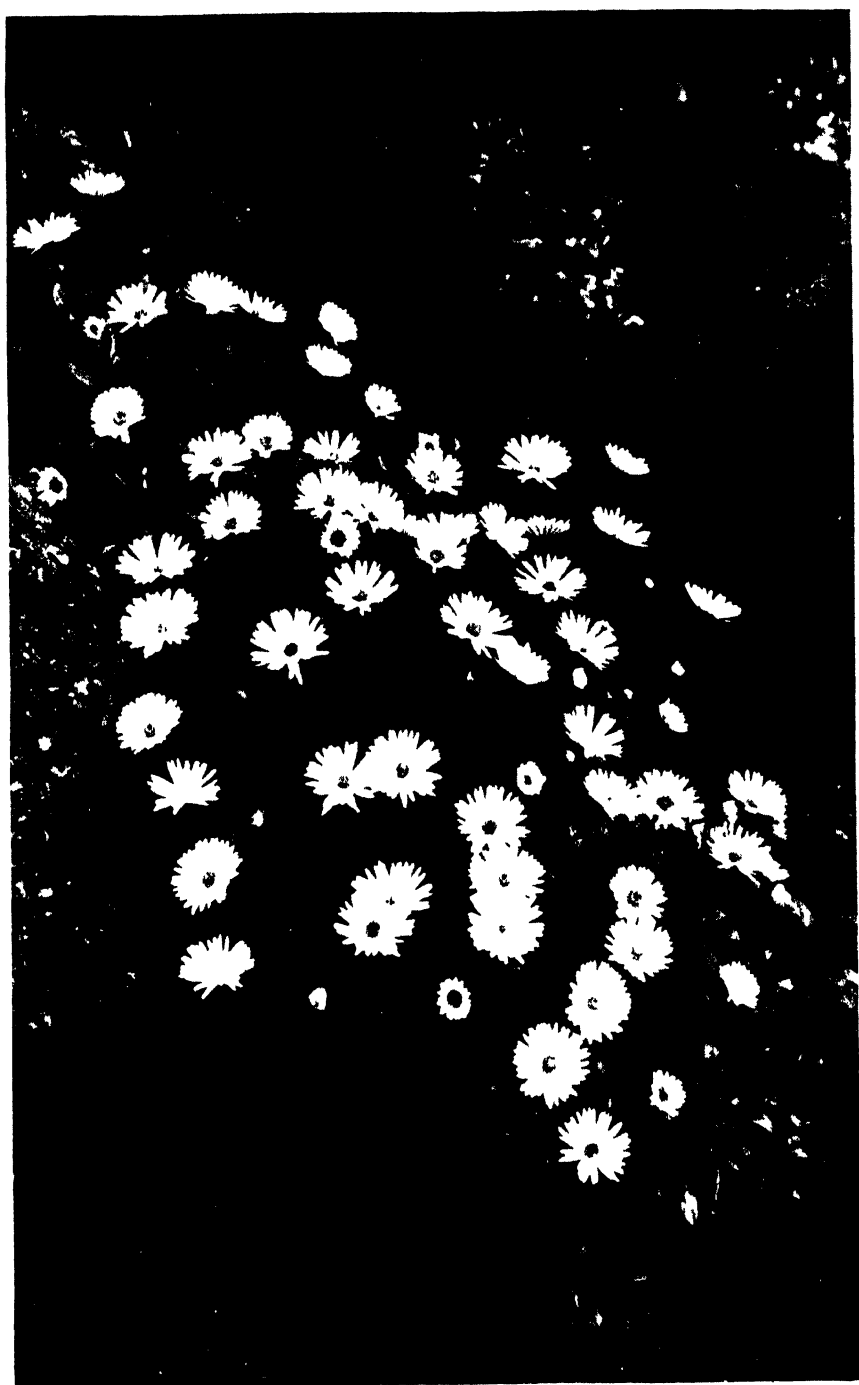


FIG 52—*Celmisia hieracifolia* (See p. 152)



FIG 53—*Celmisia gracilentia* (See p 152)



Photo, B. Mulligan

FIG 54—*Amelanchier Cusickii* on basalt rocks, Washington State, U S A (See p 156)

it somewhat resembles, except that it is much larger in all its parts. Several other suggestions on its parentage have also been made.

It is easily increased by cuttings or division but often in the first year just develops a mass of basal leaves and only a few flowering stems. These are freely produced the second year. It was at one time grown under the name of *Chrysanthemum erubescens*. Seedlings from it vary, and a number of named varieties are on the market.

Cimicifuga racemosa. An ornamental border plant 4 to 6 feet high bearing in July and August rigid, erect, compound racemes often 2 feet long of small white flowers, well above the triternate decomposed leaves. The beauty is further enhanced when in fruit by the two rows of follicles. A native of N. America, where it grows in shaded woods, *Cimicifuga* succeeds in either half-shade or open position, but appreciates good soil. Propagated by division in the spring or by seeds, which are best sown as soon as ripe in a cold frame. Most members of the genus give off an unpleasant smell, probably the reason for its common name of Bugbane. The rhizome of *C. racemosa* has been used in medicine, employed as a remedy for rheumatics, neuralgia and dyspepsia, as well as other complaints, but I think its value is questionable. Another name for this plant is *C. serpentaria*.

Coreopsis lanceolata. No herbaceous border could be complete without this useful N. American species, 2 feet or more high and one of the most popular of hardy perennials, its bright yellow flowers, 2 inches or more across, are produced during most of the summer, and are extensively used for cut flowers. There is sometimes confusion between this species and *C. grandiflora*, but the latter is a short-lived perennial better treated as a biennial and some of the leaves are pinnatifid, where those of *C. lanceolata* are lanceolate, and it is a good perennial. It is easily propagated by division in the spring. Both *C. lanceolata* and *C. grandiflora* are readily raised from seed and the plants are best grown in a light rich soil, being readily killed by excessive moisture at the roots.

Delphinium cardinale. When thinking of Delphiniums, one's mind usually goes to flowers with shades of blue and perhaps purple, so that this somewhat neglected species makes a good contrast. Its elongated racemes of bright red flowers with deep yellow petals, rise 2 feet or more above the digitately divided leaves. Although it was introduced from S. California nearly a century ago, it is not very often seen. Certainly it is short lived, but it is readily raised from seeds. These are best raised in a cold frame and planted out when large enough. It succeeds best in a light sandy soil.

Dicentra spectabilis (Fig. 48). A native of China and commonly known as Bleeding Heart, this is one of the most beautiful of spring flowering perennials. Its attractive, fern-like foliage and simple racemes 1 to 2 feet high of deep rosy-red and white, pendulous heart-shaped flowers has always made it a popular plant. It succeeds in a light rich soil and is suitable either for the border or wild garden. Increased by division of the crowns or roots, as well as by seed. It is also useful for forcing, providing it is done gently. After that it should have at least one year's rest in the border or nursery. It was collected by ROBERT

FORTUNE from N. China during his mission for the Horticulture Society.

Dictamnus albus, sometimes called *Dictamnus Fraxinella* (Fig. 44). With its strong aromatic scent, this is certainly an old garden favourite. Its strong, terminal racemes of fragrant white flowers in June, above its alternate, odd pinnate, persistent, glossy leathery foliage, make it one of the most permanent and beautiful features of the herbaceous border. It will succeed either in full sun or partial shade in good soil, lasting for many years when once established. Easily increased by seed, which should be sown as soon as ripe, also with some difficulty by division. When once established, it should not be disturbed as it improves with age, producing more flower stalks. It is a native of S. Europe to China. There is a giant form (var. *caucasicus*) as well as purple and rose-coloured ones. It is commonly known as Dittany, Fraxinella, Gas Plant and Burning Bush, the last two names from the fact that like many other members of Rutaceae, it gives off a volatile oil and if on a sultry still summer evening, a lighted match is applied to the stem below the clusters of flowers, the vapour ignites.

Dracocephalum sibiricum, a Labiate from Siberia, has been grown in this country for nearly 200 years and yet it is only of recent years that its value as a border plant has been appreciated. Its erect branching stems 2 to 3 feet high terminating in short pedunculated cymes of bluish or lavender-violet, funnel-shaped flowers above its stalked, dark green, oblong lanceolate, serrate, 2 to 4 inches long leaves, make a good show during the summer and continue for quite a long time. It was grown for some years under the name of *D. Stewartianum*, and for many years, here at Cambridge, under the name of *Nepeta macrantha*, which with *N. sibirica* are synonyms. It is perfectly hardy and readily increased by division and by seed.

Echinacea purpurea (Purple Cone Flower). A N. American perennial, 3 to 4 feet high, this is one of the most desirable plants for the herbaceous border, producing flowers for quite two months of late summer on long, strong, nearly leafless stems. Its large solitary heads of flowers, some as much as 5 inches across, with attractive, usually drooping ligules which vary from rose to purple and crimson, surrounding the receptacle of rigid, lanceolate scales, which are green, tinged with red and terminated by a black rigid spine. It will grow in ordinary soil but responds to good treatment in sandy loam, preferably a warm sunny position. It may be propagated by seed, although the better forms should be multiplied by division, providing it is not done too often. It is sometimes known as *Rudbeckia purpurea* and *Branneria purpurea*.

Eremurus. Good well grown plants of *Eremurus* always add dignity to any garden. These handsome Liliaceous plants, with their large rosettes of leaves and flower stalks, some kinds reaching to a height of 6 to 7 feet, half of which is sometimes furnished with star-shaped white, rosy or yellow flowers, remain in bloom for nearly a month.

Eremurus Bungei, a charming dainty species from Persia, with dense oblong racemes 5 to 6 inches long of bright, pure yellow flowers with stamens of the same colour, twice as long as the perianth, giving the inflorescence a very feathery appearance, the terete scapes being 18 to

20 inches high, the glabrous minutely ciliate leaves 1 foot long. It is more tender than some species and well worth a sheltered position.

E. himalaicus, a very striking plant in May, often reaching a height of 6 feet with often nearly half the length of the flower stalk a dense raceme, 3 to 4 inches in diameter, of pure white flowers, with yellow anthers, the stamens the same length as the perianth segments. The flaccid, ligulate leaves being about one-third the length of the flower stalks. Native of the Western Himalayas at an elevation of from 7,000 to 10,000 feet above sea level. (Fig. 43.)

E. robustus, a native of Turkistan, is undoubtedly the finest of the whole genus and a well-grown specimen is a fine sight in June with its racemes of beautiful rosy-pink flowers, on stout erect scapes which sometimes reach a height of 6 to 8 feet rising from a rosette of glaucous leaves 2 to 3 feet long.

Many very beautiful hybrids have been raised from some of these and other species, some of which we have seen and admired from time to time at the fortnightly shows.

They all like a rich well-drained soil and plenty of water during the flowering season and should be disturbed as little as possible. It is advisable to give some protection to the crowns in the form of a mound of ashes during the winter and to protect the young leaves and shoots from late frosts. They can be increased by division of the thick fleshy root stock in the spring or by seed which is best sown as soon as ripe.

Eryngium. No herbaceous border could be complete without at least one of the ornamental Sea Hollies of which there are several very decorative kinds, with steel-blue or purplish rigid stems, prickly foliage and teasel-like heads.

Eryngium amethystinum, with its branching blue stems, amethyst coloured, globose heads of flowers, surrounded by lanceolate bracts, and its spiny, rigid, bipinnatifid leaves is one of the best. *E. dichotomum*, *E. Oliverianum* and *E. planum* are also desirable plants. They all prefer a light, rich, sandy soil in a sunny position. Increased by seeds which are best sown as soon as ripe. They can be propagated by division but it is not easy, as they resent root disturbance.

Euphorbia epithymoides, often known in gardens as *E. polychroma* (Fig. 45). An attractive spurge from eastern Europe that is suitable for either the formal or informal border, forming an attractive clump of many stems 1 foot or more high, with its beautiful bright yellow foliage of different shades during May and June, which is more conspicuous than its umbels of greenish-yellow flowers.

E. palustris and *E. pilosa*, related species, are also ornamental foliage plants, the former requiring more moist conditions; it is an interesting plant for, after flowering, it develops a secondary growth which gives the appearance of the young growth of a Willow that has been cut back. All can be increased by seed, by division in the spring or by cuttings of a young growth.

Helopsis helianthoides, also known under the names *H. laevis* and *Buphthalmum helianthoides*. A N. American plant 4 to 5 feet high, having branching stems with terminal and axillary, long-stalked, numerous heads of yellow flowers, 2 to 2½ inches across, during the

autumn. Leaves thinnish, usually opposite, sometimes in threes, ovate-lanceolate and coarsely toothed.

Heliopsis helianthoides var. *Pitcheriana* is a more dwarf and bushy form with flowers of a deeper colour which are produced more freely. It is one of the best of border plants. Both type and variety are good for a dry position and excellent for cut flowers when they remain fresh quite a long time. The variety is readily increased by division, while the type may also be raised from seed.

Kirengeshoma palmata, another monotypic genus, a native of Japan where it grows in the open woods at an elevation of over 5,000 feet on Mount Ishizuchi. A handsome plant 2 to 3 feet high, bearing freely in August and early September large, campanulate, waxy-yellow, five-petalled flowers $1\frac{1}{2}$ to 2 inches in diameter, which are borne in axillary, terminal, usually three-flowered peduncles on slender, glabrous purple stems, above handsome, palmately-lobed, coarsely toothed, papery leaves, the lower ones being long-stalked, the upper ones less so. It succeeds in rich soil in a cool damp place and in a shady part of the border. Once planted it should be left alone and only dug up to multiply it by division.

(To be continued.)

NOTES FROM FELLOWS

Omar Khayyam's Rose

IN 1913 J. G. BAKER, writing in the Historical Introduction to *The Genus Rosa*, by ELLEN WILLMOTT, mentions on p. x that MR. SIMPSON, the artist of the *Illustrated London News*, brought home from Nashipur a Rose hip collected from a bush which grew on the grave of the poet OMAR KHAYYAM.

From available records it appears that MR. SIMPSON presented the Rose hip to MR. BERNARD QUARITCH in 1884, and he in turn gave it to MR. BAKER, at that time First Assistant in the Herbarium, Royal Botanic Gardens, Kew. A plant was raised at Kew from the seeds it contained, and on flowering was identified as *Rosa damascena*, and its name appears in the *Hand List of Trees and Shrubs, Royal Botanic Gardens, Kew*, 1934 edition, on p. 282, as var. 'Omar Khayyam.' It has sweetly scented double pink flowers and the parent plant on Omar Khayyam's grave was considered to belong to a long-cultivated race, as *Rosa damascena* has apparently not been found in the wild state.

A plant raised from a cutting from the original seedling was planted at the head of the grave of EDWARD FITZGERALD, the translator of the *Rubaiyat*, in the churchyard surrounding Boulge Church, near Woodbridge, Suffolk.

A metal plate attached to the wire guard surrounding the plant bears these words:

"This Rose Tree, raised in Kew Gardens from seed brought by Wm. Simpson, Artist-Traveller, from the grave of Omar Khayyam

at Nashipur, was planted by a few admirers of Edward Fitzgerald in the name of the Omar Khayyam Club, 7th October 1893."

It will be noted that this statement does not quite agree with the actual facts, in that it was a cutting from the Kew plant which was planted and not a plant raised from seeds. I have verified this by referring to the Curator of the Royal Botanic Gardens, Kew.

Since coming to live in Suffolk about four years ago I have visited FITZGERALD's grave on several occasions in order to attempt to keep a promise I made to the Secretary of the Omar Khayyam Club to do everything I could either to revive the existing Rose or propagate a new one, or both.

The first time I saw the plant it consisted mostly of dead wood, and although I cannot be certain that it was the original one sent from Kew there is no doubt that it was many years old. It has, I suspect, suffered a good deal at the hands of souvenir hunters, who have indiscriminately removed small branches. After cutting out all the dead wood I feared at first that a gardener had been called in too late to be of real assistance, but in January 1946 a few weakly shoots were removed and grafted on to seedlings of *Rosa canina*. These were potted and placed in a warm propagating house, but unfortunately during a spell of severe frost the boiler supplying the heat developed a fault and all the Roses grafted by us that year were lost. It did not prove possible to obtain suitable budding wood the following summer, neither was it practicable to secure grafts during the very severe weather in the early months of 1947.

The Omar Khayyam Club made one of its pilgrimages to Woodbridge on July 19, 1947, when I had the honour of being invited to lunch at the Bull Hotel, and during the proceedings was able to give an up-to-date report about the attempts made to increase the Rose. Following lunch, the Club visited FITZGERALD's grave, where with LORD HORDER I made a careful examination of the plant. It was decided to extend the ring of cultivated soil around the base of the remaining stems, but it was felt that little could be done for the plant, and we left hoping that just sufficient sap remained in the few live branches to provide one or two buds.

The Club's visit was followed shortly afterwards by that of a first-class Rose budder from our staff, and he brought back to the nursery the only suitable propagating material available. From this a few weakly buds were obtained, and these were budded on to stocks of *Rosa rugosa* during our normal budding programme. It is too early to be sure of success, but an examination of the buds to-day (February 10, 1948) resulted in finding four alive, and it is hoped that these will survive the winter.

The existence at Boulge Farm of a plant of the Rose, which had been raised from the one in the churchyard, was mentioned to me by the head gardener at Boulge Hall. I duly investigated this on February 5, and was rewarded by being allowed by MR. ANDERSON, the farmer, to remove the only shoot the plant bore suitable for grafting purposes.

The Curator of the Royal Botanic Gardens, Kew, stated that the only plant remaining in the collection there is in poor health, but a

serious attempt is being made to propagate a new one. We have arranged to maintain contact regarding results and sincerely hope that between us we shall be able to provide a new plant to take the place of the worn out specimen on FITZGERALD'S grave and so keep in cultivation a descendant of a Rose having such interesting associations.

F. P. KNIGHT.

THREE INTERESTING CELMISIAS

Celmisia hieracifolia

Celmisia hieracifolia forms many rosettes of stiff leaves, the stems of which are woody at the base and which will root quite readily if covered with soil. The leaves measure upwards to 6 inches in length and about 1 inch across at the widest part, obovate or oblong, and with finely toothed margins; the undersides are covered with a thick white felt and the upper sides a deep green.

Each rosette sends up two or three flowering stems, these are erect and stout and measure about 10 inches in height, covered with wool but not so densely covered as the undersides of the leaves. The flower heads are about 2 inches or more in diameter, the ray florets long and slender and pure white while the disc florets are yellow.

This species is one of the easiest to grow and flower of this attractive genus, seeds do not ripen any better than the others, but the shoots can be rooted as cuttings or if covered with soil will root as layers. Full sun and good drainage is required; if given these it never fails to flower each year.

A native of New Zealand, it is found on both North and South Islands. (Fig. 52.)

Celmisia gracilentia

This plant is one of several species that for many years was included under the name of *Celmisia longifolia* and it was in his last edition of New Zealand flora that CHEESEMAN raised it to specific rank with the name of *C. gracilentia*.

It is found in the North and South Islands and also on Stewart Island, where it grows from sea-level to about 5,000 feet.

A very hardy species, the leaves are densely tufted and not forming definite rosettes like others of the same genus; the leaves, which vary in length from 3 inches upwards to about a foot are very narrow and usually about $\frac{1}{8}$ inch in width, very thick in texture, curved on the upper side with a channel along the centre and with recurved margins; in colour they are a greenish-brown and often speckled, with a dense covering of white cobwebby wool especially on the underside.

During summer from these tufts arise several slender flower stems, the height of which about equals the length of the leaves; these, too, are covered with white wool. The flower heads are from $\frac{1}{2}$ to $\frac{3}{4}$ inch in diameter, the ray florets being pure white and the disc florets yellow.

This dainty plant is perfectly hardy and requires a well-drained ledge in full sun.

Seeds of *Celmisias* do not ripen well in the east of Scotland, but this species can be divided in the early spring with success. (Fig. 53.)

Celmisia major

At one time known as *C. longifolia* var. *major*, this plant is a native of the North Island of New Zealand.

It forms dense clumps of spreading or recurved leaves, which measure from 4 to 12 inches in length and from a $\frac{1}{4}$ to $\frac{3}{4}$ inch in width, narrow linear and long tapering to the point and forming a broad sheath at the base. There is a fine layer of white wool on the upper surface and on the under surface there is a dense covering of thick white wool. Like the others of this group, the margins are revolute.

From these tufts there are several erect and stout flowering stems as long or longer than the leaves, these, too, are covered with a layer of white wool. The flower heads are as much as $1\frac{1}{2}$ inches across with pure white rays and yellow disc florets.

An attractive plant at all times of the year either for the scree or for a ledge where there is good drainage and full sun.

It is a much stiffer plant than *C. gracilenta*, with broader leaves, stouter stems and the silvery appearance under which the leaves are green and not brownish as in *C. gracilenta*. (Fig. 51.)

Royal Botanic Garden, Edinburgh.

D. WILKIE

Eremurus himalaicus

Eremurus himalaicus is a native of the Western Himalaya from Kashmir to the Sulej and I was fortunate enough to find it in flower during July on several occasions while plant-hunting in Kashmir during the war years. It is a striking plant, usually found growing in well-defined colonies on grassy hillsides at 10,000 to 11,000 feet. The white flower spikes stand 3 to 5 feet high and are cylindrical in shape, well set off by the dark tint of the unopened terminal buds. It is strictly a limestone species in my experience, and often happily associated with indigo-blue drifts of *Lindelia longiflora*.

I have no experience of this species in cultivation, but it received a First Class Certificate in 1887, and COLONEL STERN informs me that at Highdown it is the first *Eremurus* to flower: in his garden the flower spikes attain 6 feet and the plants grow happily in a chalky loam, well drained and in full sun.

When planting, the roots should be well spread out, with the centre a little higher than the rest, and only just below the surface of the soil.

My photograph (Fig. 43) was taken in bright evening sun at 10,600 feet below the Viji Gali, near Gurais, Kashmir.

ROGER BEVAN

Orchids and Frost

As a very amateur grower of Orchids, no doubt some of my methods of cultivation would be frowned upon by the expert, but I get a considerable amount of pleasure from this hobby, and other amateurs may like to know of my experiences under very unfavourable conditions.

My small collection is comprised of *Cattleya*, *Cypripedium*, *Bifrenaria*, *Coelogyne*, *Dendrobium* and *Oncidium*. During the winter of 1946-47 I was able to obtain a small allowance of fuel, but had to keep the temperature in the greenhouse down as low as possible so as to avoid extremes. On occasions the thermometer outside registered 22 degrees of frost and only on two nights during that winter did the temperature in the house fall to 30 degrees F. None of the Orchids mentioned above suffered any ill effects during this cold spell, the *Dendrobiums* and *Cypripedium Lecanum* were in flower, the two degrees of frost made the flowers droop a little but a fine spray of water over the plants from the greenhouse water tank about 10 o'clock in the morning, and a gradual bringing up of the temperature to about 35 degrees F., and by midday they had picked up again. The flowers on these plants remained fresh for over five weeks. The *Dendrobium nobile* are planted in a wicker basket 15 inches deep and 8 inches across; this is filled with bracken fibre, crocks, charcoal, and sphagnum moss, the moss grows well and is a good mat on top of the basket, the roots of the Orchids come through the wicker work and find their way in again at several points. The *Coelogyne cristata* were about a fortnight later than usual but flowered splendidly. The *Cattleya*, *Bifrenaria Harrisoniae*, and *Oncidiums* flowered in their correct season.

The winter 1947-48 is a different story, I was not allowed any fuel and have been at the mercy of the weather. On one night the thermometer in the house registered 7 degrees of frost, and this had a disastrous effect upon some of the types. The *Coelogyne*s, apart from all the flower buds having dropped off, have suffered no harm to the plants. *Dendrobium nobile* have also lost all the flower buds, and the tips of the shoots have been nipped for two to three inches, but several young shoots are appearing from the base and some of the nodes. The *Oncidiums* appear to be quite dead. Several *Bifrenaria Harrisoniae* in six-inch pots are dead, but an eighteen-inch pot of some thirty to forty years of age has only suffered damage to that part of the plant that is nearest to the edges, and I shall be able to make up some more smaller pots from this. This was a wonderful pot and has at times produced about thirty first rate spikes of flower. *Cypripedium Lecanum* is quite untouched, but a hybrid *Cypripedium* 'St. Albans,' which has a very deep purple flower, has suffered damage to the outside leaves, but the crowns are quite unharmed. Three pots of *Cattleya* appear to have come through unscathed. At one period I had about four dozen *Calanthe* (*C. rosea*, *C. Veitchii* and *C. vestita*). In the days when fuel was plentiful these were a successful and easily grown Orchid, but it is not the slightest use trying to grow them with little or no heat, and to my sorrow, when fuel became difficult to obtain, I lost the lot.

CHARLES H. W. GIFFARD INGE

AMELANCHIER CUSICKII FERNALD

B. O. Mulligan

(Director, University of Washington Arboretum, Seattle)

ON Easter Saturday, April 5, 1947, my wife and I were in Central Washington, at Vantage on the Columbia River, making our first plant collecting trip east of the Cascade Mountains in the experienced company of MR. and MRS. L. N. ROBERSON of Seattle. Lunch that day was cooked and enjoyed in warm sunshine on the shingle banks edging the river, where a little yellow-flowered umbelliferous plant with very finely-cut glaucous foliage was doing its best to brighten the stones. Not far away, though only on this eastern bank, were scattered trees of *Juniperus scopulorum*, forming short (up to 20 feet or so) pyramids of varying tones of sage or olive-green, some with widely spaced, others with more closely overlapping branch systems; occasionally the waxy-coated, blue-purple berries could be picked up from the sandy soil beneath the trees.

In the afternoon we continued up the road for two or three miles eastwards up a gradual ascent, the river valley below us at an increasing depth on our left. Near the top of the plateau—a brown and barren-looking country to anyone unfamiliar with it—we turned off the highway up a rough track into what might once have been an old quarrying area, more or less surrounded by the rapidly eroding basalt cliffs with piles of rubble at their bases, and proceeded to seek what we might find, which in my own case was particularly the shrubby flora, though the pleasure and thrill of finding such plants as *Fritillaria pudica* and *Lewisia rediviva* in their natural haunts could not be denied.

The first shrubs to meet the eye were a *Ribes* with dangling white tubular flowers in pairs, growing on the stone piles, and chiefly on or at the foot of the cliffs conspicuous *Amelanchier* in full bloom, possessing the largest pure white flowers known to me in this ornamental genus. The former I discovered later to be *Ribes cereum*, introduced to cultivation in Britain by DOUGLAS 120 years ago who sent seeds back to the Horticultural Society of London (see *Bot. Mag.* t. 3008 (1830)), but the latter required the detailed information of DR. G. N. JONES' monograph of the genus* before I could feel reasonably certain of its identification as *A. Cusickii* Fernald.

As seen in those almost vertical, dry-looking cliffs (reminiscent of Highdown had they been of chalk and not basalt) it was such an outstanding early flowering shrub that I felt some notes and photographs were both justified and required. Good as it was under those conditions, would it not be even better with some less spartan diet, less barren surroundings, and some annual pruning and attention?

One of the strange and aggravating features of this plant was the fact that although I searched round every plant within reach, and clambered up several precipitous cliff faces, not a single young seedling was to be found—none less than 3 to 4 feet in height, and the few of those dimensions well rooted into the rock and obviously immovable.

* "American Species of *Amelanchier*." G. N. JONES. Illinois Biological Monographs, Vol. XX, No. 2. University of Illinois Press, Urbana (1946).

Either the local birds or fauna must devour the fruits including the seeds, or some other conditions prevent a natural increase in this area. Perhaps the species is barely maintaining itself here, and this colony represents a dwindling outlier of the main body to the east and south. However, being determined not to return empty-handed if there was any material to be had for propagation, I eventually discovered and excavated a single sucker growth with sufficient root to give some hope of establishing it in Seattle with care, and also took some very soft young growths as possible cuttings, although the likelihood of these rooting seemed small.

In which supposition time duly proved my fears to be correct, for all failed. But the sucker, on the other hand, after being potted and cherished in the greenhouse for two or three months, survived to make fresh roots and has been duly planted out in the nursery with the hopes that in another two seasons it may be fit to join its relatives in the Arboretum proper.

The picture (Fig. 54) shows one of the plants, 10 to 12 feet tall, at closer quarters—the shiny smooth bark of the many gray stems springing up from the base, the oval leaves hanging below short congested terminal racemes of flowers, and the mass of twiggy branchlets forming the bush.

In JONES' monograph plate XX shows the type material from the Gray Herbarium, collected in eastern Oregon by WILLIAM C. CUSICK, bearing both flowering and fruiting branches. It was named by DR. M. L. FERNALD in 1899. On the label is written, "Fruit scarlet tardily turning black, May 3–June 10." JONES describes these as about 1 cm. in diameter, globose, juicy, and edible.

At the time of flowering the ovate leaves (the shape alters with age) are $1\frac{1}{4}$ – $1\frac{1}{2}$ inches long, subcordate at the base, obtuse to shortly acute at the apex, perfectly glabrous as are the petioles and pedicels, though the young shoots bear a few silky hairs, the margins simply serrate almost to the base with about 5 teeth to 1 cm. When mature (and I was able to collect plenty of the dry previous year's leaves below the cliff overhang) they are ovate to oval, 2 inches long by $1\frac{1}{4}$ – $1\frac{3}{8}$ inches wide, sharply serrate with usually an obtuse apex and a rounded or broad-cuneate base, the petiole about $\frac{3}{4}$ inch long.

The flowers (largest in the genus according to JONES) are borne in dense short racemes of 5–7 on a glabrous and leafy stem; pedicels $\frac{1}{4}$ – $\frac{1}{2}$ inch long, sepals long acuminate, silky on the inner surface, petals $\frac{3}{4}$ -inch long, strap-shaped, recurving, $\frac{1}{4}$ -inch wide at apex, stamens 18–20, styles usually 4, divided about a third, glabrous; top of ovary silky-hairy.

JONES describes the styles as "5 or 4—united below the middle or nearly free to the base of the styles." The range of habitat is from Kamloops, B.C. (one record only), due south through central Washington and Oregon, eastwards to north-western Idaho, western Montana, and extreme northern Utah.

In the area where I found these plants the average rainfall is from 7.75 to 9.25 inches annually; the average January temperature about 25°–26° F. and the average July temperature 70°–75° F.

WISLEY TRIALS

BORDER CARNATIONS AT WISLEY, 1946-47

Seventy-four varieties of Hardy Border Carnations were grown at Wisley during 1946 and 1947; of these eleven were grown for the first time, the remainder being those which had been retained for future judgment and the comparison varieties, against which the new-comers to the trials are tested.

The plants, five of each variety, were planted on March 21, 1946, and were judged by the Joint Committee of the Royal Horticultural Society and the National Carnation and Picotee Society, and allowed to remain during the winter, being finally judged on July 4, 1947, by the Joint Committee, who made their recommendations for Awards as given below.

WHITE SELFS

Madonna (raised, introduced and sent by Messrs. Allwood Bros. Ltd., Haywards Heath, Sussex). **F.C.C.** July 4, 1947. Described **R.H.S. JOURNAL**, 64, p. 567 (**A.M.** 1940).

The following variety has been retained for future judgment: **EDENSIDE WHITE** (Douglas).

YELLOW SELF

The following variety has been retained for future judgment: **SPENCER DAVIES** (Thorburn).

APRICOT SELF

The following variety has been retained for future judgment: **MRS. A. T. KEMBLE** (Allwood).

PINK SELFS

Rose Bradwardine (sent by Messrs. Allwood Bros. Ltd., Haywards Heath, Sussex). **A.M.** July 4, 1947. Plant vigorous, of bushy habit, with stout, rigid flower stems. Flowers 2½ inches diameter, freely produced, of good form; petals broad, entire, bright rose-cerise; calyx strong.

The following varieties have been retained for future judgment: **COTTAGE ROSE** (Allwood); **COTTAGE WONDER** (Allwood); **FORTROSE** (Allwood).

FLOWERS OLD ROSE

Belle of Bookham (raised and introduced by Mr. James Douglas, and sent by W. G. Ferris, Esq., Woodhurst, High Warren, East Horsley, Surrey). **A.M.** July 4, 1947. Plant vigorous, with stout, rigid flower stems. Flowers 3 inches diameter, freely produced, full centred; petals broad, entire, Rhodnite Red (H.C.C. 0022); calyx strong.

SCARLET SELF

W. B. Cranfield (sent by Messrs. Allwood Bros. Ltd., Haywards Heath, Sussex). **A.M.** July 4, 1947. Plant vigorous, of bushy habit, with stout flower stems. Flowers 3 inches diameter, freely produced; petals broad, entire, Cherry Red (H.C.C. 722); calyx strong.

RUBY SELFS

The following varieties have been retained for future judgment: **COTTAGE CLARET** (Allwood); **COTTAGE RUBY** (Allwood).

MAUVE SELFS

The following varieties have been retained for future judgment: **JEAN FROST** (Goodfellow); **SOUTHERN MIST** (Hayward).

FANCIES

Afton Water (raised by Mr. James Douglas and sent by W. G. Ferris, Esq., Woodhurst, High Warren, East Horsley, Surrey). **F.C.C.** July 4, 1947. Plant vigorous, of bushy habit, with erect, rigid flower stems. Flowers $3\frac{1}{2}$ inches diameter, of good form; petals entire, Neyron Rose (between 623/1) and 623/2) broadly splashed with Rose Madder (H.C.C. 23/1); calyx strong.

Leslie Rennison (raised by the late R. Thain and sent by W. G. Ferris, Esq., Woodhurst, High Warren, East Horsley, Surrey). **A.M.** July 4, 1947. Described R.H.S. JOURNAL, 72, p. 206 (H.C. 1946).

Mary Livingstone (raised by Mr. James Douglas and sent by Jas. Fairlie Esq., 17 Mayfield Road, Acton, London, W. 3). **H.C.** July 4, 1947. Plant vigorous, bushy habit, with rigid flower stems. Flowers 3 inches diameter, of good form; petals entire, Lilac Purple (H.C.C. 031) and Pansy Violet (H.C.C. 033) flaked crimson; calyx strong.

Southern Breeze (raised and sent by F. J. Hayward, Esq., 43 Mill Road, Maldon, Essex). **C.** July 4, 1947. Plant vigorous, bushy habit with stout, rigid flower stems. Flowers 3 inches diameter, of good form; petals broad, entire, Blood Red (H.C.C. 820/3) heavily splashed and edged Oxblood Red (H.C.C. 00823/1); calyx strong.

The following varieties have been retained for future judgment: DAWN LIGHT (Goodfellow); DIPLOMAT (Allwood).

WHITE GROUND FANCIES

Merlin Clove (raised by Mr. James Douglas and sent by Messrs. Allwood Bros. Ltd., Haywards Heath, Sussex). **F.C.C.** July 4, 1947. Described R.H.S. JOURNAL, 62, p. 462 (A.M. 1936).

Mrs. Edmund Charrington (sent by Messrs. Allwood Bros. Ltd., Haywards Heath, Sussex). **F.C.C.** July 4, 1947. Described R.H.S. JOURNAL, 62, p. 462 (A.M. 1936).

William Newell (raised, introduced and sent by Mr. F. W. Goodfellow, Valley Nurseries, Aldridge, Staffs.). **A.M.** July 4, 1947. Plant vigorous, compact bushy habit, with stout, erect flower stems, 18 to 22 inches long. Flowers double, $2\frac{3}{4}$ inches diameter, of good form; petals broad, almost entire, white ground broadly edged and flaked with Geranium Lake (between H.C.C. 20 and 20/1), calyx strong.

The following varieties have been retained for future judgment: JOHN STOBART (Allwood); MARY CARMICHAEL (Ferris); NOBILITY (Allwood); SOUTHERN PRINCESS (Hayward).

The following varieties have been deleted from the trials: DUKE OF KENT, H.C. 1940; HIGHLAND DIVISION; PAT HOLES.

YELLOW GROUND FANCIES

Fascination (raised by Mr. James Douglas and sent by W. G. Ferris, Esq., Woodhurst, High Warren, East Horsley, Surrey). **H.C.** July 4, 1947. Plant vigorous, bushy habit with stout, erect flower stems, 18 inches long. Flowers double, 3 inches diameter; petals broad, entire, sulphur yellow overlaid with Geranium Red (H.C.C. 20/2) and broadly edged with Orchid Purple (H.C.C. 31/2); calyx strong.

The following varieties have been retained for future judgment: BOOKHAM FAVOURITE (Douglas); CATHERINE GLOVER (Allwood); COTTAGE JEWEL (Allwood); DAVID DOUGLAS (Douglas); HEARTSEASE (Goodfellow).

The following variety has been deleted from the trials: INDOMITABLE (Goodfellow).

PICOTEES

Silas Osbaldiston (raised by Mr. Silas Osbaldiston and sent by James Fairlie, Esq., 17 Mayfield Road, Acton, London, W. 3). **H.C.** July 4, 1947.

Plant vigorous, bushy habit with erect flower stems, 18 inches long. Flowers double, $2\frac{1}{2}$ inches diameter, open centre; petals broad, entire, creamy-white edged Peony Purple (H.C.C. 729/2); calyx strong.

The following varieties have been retained for future judgment: E. M. WILKINSON (Ferris); EVA HUMPHRIES (Humphries); MRS. J. J. KEEN (Allwood); PERFECTION (Allwood); ROSE FRILLS (Allwood); TOGO (Allwood).

SELF-BLANCHING CELERY AT WISLEY, 1947

Thirteen stocks of Self-Blanching Celery were received at Wisley for trial in 1946. Prior to sowing, the seed was given the Formalin treatment against Celery Leaf Spot (*Septoria Apii*), which consists of immersing the seed for three hours in a solution of Formalin, 1 in 300; this, while not controlling the disease entirely, greatly lessens the amount of infection. No signs of the disease were apparent until late September, when normally the crop would have been utilised.

The seed was sown under glass on March 31, and pricked off when large enough to handle, and planted out on the flat—not in trenches—in rows 12 inches apart, 9 inches separating the plants in the rows. In spite of the dry summer, the plants grew well, with the aid of overhead irrigation.

There appear to be several strains of this vegetable and it would appear that the dwarf strains are preferred to the taller. The green, not readily blanching forms, are very little grown; the white self-blanching forms are preferred by many growers, they blanching readily without any material aid.

The trials were inspected by a sub-committee of the Fruit and Vegetable Committee, who made their final decisions and recommendations for Awards on September 11, as given below.

GREEN, NOT READILY BLANCHING

WHITE PLUME (Ferry-Morse Seed Co.); UTAH (Ferry-Morse Seed Co.); SUMMER PASCAL (Ferry-Morse Seed Co.).

WHITE, SELF-BLANCHING

Golden Self-Blanching (raised by Messrs. Ferry-Morse Seed Co., introduced and sent by Messrs. Watkins & Simpson Ltd., 27 Drury Lane, Covent Garden, London, W.C. 2). **A.M.** September 11, 1947. Plant 22 inches tall; leaf-stalks creamy-white, solid and brittle. Suckerless and free from green leaf-stalks. A very good level stock.

Golden Self-Blanching (raised by Messrs. Ferry-Morse Seed Co., and sent by Messrs. A. L. Tozer Ltd., Pyports, Cobham, Surrey). **A.M.** September 11, 1947. Very similar to the foregoing but on the whole dwarfier and with paler foliage. Free from suckers and green leaf stalks. A very good level stock.

Non-Bolting Plume (raised, introduced and sent by Messrs. Ferry-Morse Seed Co., San Francisco, California, U.S.A.). **A.M.** September 11, 1947. Plant 18 inches tall, compact dwarf habit, thick; leaf stalks very solid and brittle, creamy-white. Free from suckers and green leaf-stalks.

GOLDEN DETROIT (Ferry-Morse Seed Co.); GOLDEN PLUME (Ferry-Morse Seed Co.); GOLDEN SELF BLANCHING (A. R. Wills Ltd.); SUPREME GOLDEN (Ferry-Morse Seed Co.), rather soft and greenish; TALL NON-BOLTING GOLDEN PLUME (Ferry-Morse Seed Co.), tall and rather green.

LEEKS AT WISLEY, 1946-47

Twenty-four stocks of Leeks were grown in the trials during 1946; of these, five were grown for comparison, being good commercial stocks. They were: LYON, A.M. 1923; ACQUISITION; PRIZETAKER; RENTON'S MONARCH, C. 1923; and WALTON MAMMOTH, F.C.C. 1938.

They were sown in the open on March 21, 1946, and planted in their permanent position on June 20, 1946. The plants were in rows $1\frac{1}{2}$ feet apart, 9 inches separating the plants in the rows, and were planted by dropping into holes made with a dibber and not in trenches. All the stocks made good growth and were finally judged by the sub-committee of the Fruit and Vegetable Committee on January 23, 1947, who made their recommendations for awards as given below.

EARLY VARIETIES

Empire (raised, introduced and sent by Messrs. Yates & Sons (Seeds), Ltd., Evesham, Worcs.). A.M. January 23, 1947.—Foliage dark grey-green, broad; stem 7 inches long, 2 inches diameter. Early maturing yet hardy, stood the winter well. A good even stock.

Jumbo (raised, introduced and sent by Messrs. Stuart & Mein, Kelso, Scotland). H.C. January 23, 1947.—Plant of dwarf, compact habit, with grey-green foliage, of the Pot Leek type; stem 6 inches long, $2\frac{1}{2}$ inches in diameter. Maturing early and stood well.

CULLEN'S GIANT (Cullen), a rather variable stock; GOLIATH RE-SELECTED (Stuart & Mein), Lyon type; INTERNATIONAL (Nutting); NEW LONG (Ferry-Morse) not suitable for this country, bolts early; Lyon (Ferry-Morse), less hardy than the English strains; TIMPERLEY LIGHT (Samuel Yates), a variable stock.

MAINCROP VARIETIES

Early Mammoth (raised, introduced and sent by Messrs. Yates & Sons (Seeds), Ltd., Evesham, Worcs.). A.M. January 23, 1947.—Foliage very dark grey-green, broad; stems $7\frac{1}{2}$ inches long, $1\frac{1}{4}$ inch diameter. Matures early but stands well and not damaged by weather. A good regular stock.

Elephant (raised, introduced and sent by Messrs. Ferry-Morse Seed Co., San Francisco, California, U.S.A.). A.M. January 23, 1947. Plant rather similar in habit to "Lyon" but with darker and broader leaves; stems 7 inches long, 2 inches diameter. Stands well. A good even stock. Distinct from similar variety of other senders.

New Late (raised, introduced and sent by Messrs. Watkins & Simpson, Ltd., 27 Drury Lane, Covent Garden, London, W.C. 2). A.M. January 23, 1947. Plant of compact habit, with very dark green broad foliage; stem 8 inches long, 2 inches diameter, very regular; stands very well and not affected by the weather; very slow to form bulbs.

CARENTAN (Ferry-Morse), less hardy than the English strains; ELEPHANT (Bunting), distinct from above stock of this variety; EVEREST (Clucas); GIANT MUSSELBURGH (Ferry-Morse), less vigorous than the English strains; LIEGE LATE (Tozer), a long standing, late maturing variety; SCOTCH GIANT (Bunting), a poor stock, resembles Musselburgh; TIMPERLEY DARK (Samuel Yates), an Improved Flag type; WALTON MAMMOTH (Tozer), matures early yet stands very well.

AUTUMN SOWN CABBAGES AT WISLEY 1946-47

Twenty-two stocks of Cabbage were grown at Wisley. These were sown on August 7, 1946, and planted into their permanent positions on October 17, 1946. In spite of the severe winter, all made good growth and though late

to mature headed in satisfactorily. They were finally judged by a sub-committee of the Fruit and Vegetable Committee on June 27, 1947, who made their recommendations for Awards, as given below.

HEADS POINTED

Spring Flory (raised, introduced and sent by Messrs. D. T. Brown & Co., Ltd., Poulton-le-Fylde, Lancs.). **F.C.C.** June 27, 1947. Plant of compact habit with little outer foliage, dark dull grey-green, heads pointed, less so than Offenham, solid. Ready June 24. A very good even stock. Suitable for private or market use.

Wheeler's Imperial Selected (raised by Messrs. Wheelers, Warminster, Ltd., and sent by Messrs. Watkins & Simpson, Ltd., 27 Drury Lane, Covent Garden, London, W.C. 2). **A.M.** June 27, 1947. Plant of dwarf compact habit with little outer foliage, dark dull glossy green; heads pointed, of medium size, solid. Ready June 24. A more vigorous and larger selection of the original. A very good regular stock (**A.M.** 1930). Suitable for private use.

Sutton's Favourite (raised, introduced and sent by Messrs. Sutton & Sons, Ltd., Reading). **A.M.** June 27, 1947. Plant of very compact dwarf habit with few outer leaves, dark glossy green; heads pointed, solid. Ready June 30. A good even stock. Suitable for private use.

Spalding Market (raised, introduced and sent by Messrs. Elsoms (Spalding), Ltd., Spalding, Lincs.). **A.M.** June 27, 1947. Plant very similar in habit to the 'Offenham' type but with darker grey-green foliage; heads solid, pointed. Ready June 30. A good even stock. Suitable for market or private use.

Bunting's Early Gem (raised, introduced and sent by Messrs. G. A. Bunting & Co., 3-9 Bucknall Street, New Oxford Street, London, W.C. 1). **H.C.** June 27, 1947. Plant of compact habit, with few outer dark glossy green leaves, of medium size, heads pointed, solid. Ready June 20. A good even stock. Suitable for market or private use.

Sutton's Harbinger (raised, introduced and sent by Messrs. Sutton & Sons, Ltd., Reading). **H.C.** June 27, 1947. Plant of very compact, dwarf habit with few outer dark glossy-green leaves; heads pointed, very solid, of medium size. Ready June 18. A true and even stock (**A.M.** 1916). Suitable for private use.

Sutton's April (raised, introduced and sent by Messrs. Sutton & Sons, Ltd., Reading). **H.C.** June 27, 1947. Plant very similar in habit to 'Sutton's Harbinger' but larger, later to mature and with darker green foliage. Ready June 30. A true and even stock. Suitable for private use.

Early Market (raised, introduced and sent by Messrs. Watkins & Simpson, Ltd., 27 Drury Lane, Covent Garden, London, W.C. 2). **H.C.** June 27, 1947. Plant of compact habit with few outside leaves, resembling 'Offenham' but small and less pointed, very solid heads. Ready June 30. A good even stock. (**A.M.** 1937.) Suitable for private or market use.

The following varieties were included in the trials; the name in brackets denotes the sender and the date following was when the variety was fit to cut.

WHEELER'S IMPERIAL (Wheelers, Warminster), June 26; **HARBINGER** (Watkins & Simpson), June 18; **VERNALIS** (Zwaan & de Wiljes), 14 per cent. bolters, June 18; **FLOWER OF SPRING** (Sutton), June 26; **EARLY TRIUMPH** (Sharpe), June 18; **EARLY SPALDING** (Elsoms), June 30; **FIRST EARLY MARKET** (Clucas, Bunting), June 30; **EARLY MARKET** (Bunting), June 30; **DURHAM EARLY** (Clucas), June 30; **MYATTS OFFENHAM SELECTED** (Watkins & Simpson), June 30; **EVESHAM SPECIAL SELECTION** (Nutting), June 30; **EARLY OFFENHAM** (Elsom), June 29; **CONTRACT** (Edge), June 30.

VEGETABLE MARROWS AT WISLEY, 1947

Seventeen stocks of Vegetable Marrows were received for trial at Wisley in 1947. The seed was sown in the open on May 27, 1947, in rows—bush varieties 8 feet apart, trailing varieties 12 feet apart, six feet separating the plants in the rows.

The plants, on the whole, made good growth, in spite of the unfavourable season and were finally inspected on October 2, 1947, by a sub-committee of the Fruit and Vegetable Committee who made their recommendations for Awards as given below.

BUSH HABIT: Fruits White

WHITE BUSH (Sutton & Sons Ltd.).

Fruits Green

Bush Green (sent by Messrs. Watkins & Simpson Ltd., 27 Drury Lane, Covent Garden, London, W.C. 2). **H.C.** October 2, 1947. A true, even stock, with dark green striped fruits, evenly marked, of medium size and freely produced.

Bush Green, Special Early Selection (sent by Messrs. G. A. Bunting & Co., 3-9 Bucknall Street, New Oxford Street, London, W.C. 1). **H.C.** October 2, 1947. A true and level stock, with dark green striped fruits, of small to medium size, freely produced.

BUSH GREEN EARLY (Elsoms Ltd.), fruits dark green; BUSH GREEN IMPROVED (Sutton & Sons Ltd.); GREEN BUSH RESELECTED (Yates & Sons Ltd.), fruits striped; GREEN BUSH SELECTION (Nutting & Sons Ltd.), fruits striped; SUPERLATIVE (Sutton & Sons Ltd.), very dark green fruits; TENDER AND TRUE (Sutton & Sons Ltd.), fruits globular, green mottled.

TRAILING HABIT: Fruits White

Perfect Cream Trailing (raised, introduced and sent by Messrs. Yates & Sons (Seeds) Ltd., Evesham). **H.C.** October 2, 1947, suitable for private use. A very true and even stock with small, evenly shaped fruits with no neck, creamy, very free fruiting; early.

CYLINDER (D. T. Brown & Co. Ltd.); ROLLER (J. L. Clucas Ltd.).

Fruits Green

Long Green (raised, introduced and sent by Messrs. Sutton & Sons Ltd., Reading). **H.C.** October 2, 1947. A true and even stock, with long, very dark green, almost black fruits when mature, freely produced. More suitable for private use than for market.

Long Green Trailing (sent by Messrs. Watkins & Simpson Ltd., 27 Drury Lane, Covent Garden, London, W.C. 2). **H.C.** October 2, 1947. A true and level stock with very long dark green striped fruits, evenly marked, with no neck, very freely produced.

LONG GREEN TRAILING (G. A. Bunting & Co.), a variable stock; TABLE DAINTY (Sutton & Sons Ltd.), early maturing, fruits small green striped; TABLE DAINTY IMPROVED (Nutting & Sons Ltd.), an irregular stock.

PARSNIPS AT WISLEY, 1947

Twelve stocks of Parsnips were received for trial at Wisley in 1947; all germinated well and made good growth. The seed was sown on April 15 in rows 18 inches apart and the plants were finally thinned to 10 inches apart in the rows. The stocks contained very few bolters and very little canker was evident at the time of maturity.

The trials were inspected by a sub-committee of the Fruit and Vegetable Committee, who made their final decisions and recommendations for Awards on November 27, as given below.

ROOTS INTERMEDIATE, TAPERING, WIDE SHOULDER

Offenham (sent by Messrs. Elsons (Spalding) Ltd., Elsom House, Spalding, Lincs.). A.M. November 27, 1947. Roots $4\frac{1}{2}$ inches wide at neck, 26 inches long, regular, clean; neck hollow, little core. A very good even stock.

Yates' Evesham (raised, introduced and sent by Messrs. Yates & Sons (seeds) Ltd., Evesham, Worcs.). H.C. November 27, 1947. Roots $4\frac{1}{2}$ inches wide at neck, 22 inches long, clean; neck hollow, little core. A good even stock.

OFFENHAM (Watkins & Simpson Ltd.); OFFENHAM SELECTION (Nutting & Sons Ltd.); OFFENHAM SELECTED (G. A. Bunting & Co.); SHORT THICK (Ferry-Morse Seed Co.).

ROOTS LONG, TAPERING

Smooth White (raised, introduced and sent by Messrs. Ferry-Morse Seed Co., San Francisco, California, U.S.A.). F.C.C. November 27, 1947. Roots $3\frac{1}{2}$ to 4 inches wide at neck, 30 inches long, clean, almost cylindrical, almost white skin; very little core. A very true and regular stock, especially suitable for private and exhibition use.

Tender and True (raised, introduced and sent by Messrs. Sutton & Sons Ltd., Reading). H.C. November 27, 1947. Roots $3\frac{1}{2}$ inches wide at neck, 22 inches long, clean, neck hollow, tapering gradually; very little core. A good even stock.

Lisbonnais Selected (introduced and sent by Messrs. G. A. Bunting & Co., 3-9 Bucknall Street, New Oxford Street, London, W.C. 2). H.C. November 11, 1947. Roots $4\frac{1}{2}$ inches wide at neck, 22 inches long, regular, clean, neck somewhat hollow, medium core. A good even stock.

HOLLOW CROWN, THICK SHOULDER (Ferry-Morse Seed Co.); IMPROVED MARROW (Watkins & Simpson Ltd.); LISBONNAIS SELECTED (Nutting & Sons Ltd.).

BOOK NOTES

"Land and Landscape." By Brenda Colvin. John Murray. 21s.

This attractive book by the honorary secretary of the Institute of Landscape Architects is specially welcome at the present moment, for a great deal of planting should now be done. For example, the trees cut down during two protracted wars should be replaced, and the new building estates should not be left bare of trees and shrubs. "We are faced," the authoress writes, "with an unprecedented need for the services of qualified landscape architects, and an unprecedented eagerness on the part of young people to study the subject and make it a career, and yet as against eight colleges of landscape architecture in America, we in this country have, so far, none."

The book opens with a rapid and fascinating review of the development of British landscape from the earliest times to the present-day, and lessons from the past are pressed home with telling effect. For instance, it is pointed out that the owners of estates have by tradition been interested in good landscape, and it is rightly urged that planting now should be for multiple use—having regard not only to profit but also to natural beauty. There is great force in the contention that "the Forestry Commission's task seems, under present circumstances, to be set on too narrow a basis. They should in the nation's interest become responsible not only for the timber production, but also for the maintenance of the landscape quality of these estates."

There is, of course, room for difference of opinion on many of the points raised in this comprehensive work. Most people would agree that poultry farms are generally a blot on the landscape, but many would take a more favourable view of railway lines than the authoress apparently does. Surely they very often add to the interest of the countryside. And is it not premature to press for a more complete system of footpaths, until the public learn to treat living things with more care and respect? The great majority of people are considerate enough; but the small minority of the destructive are still a menace.

The book is, perhaps, a little long; but it is full of interest, and contains a number of practical suggestions of great value. The 106 plates are admirably chosen and really illustrate the argument of the 17 chapters.

J. W. HUNKIN

X "The Geography of the Flowering Plants." By R. Good. 403 pp., 16 photogravure plates, 20 line-drawings of plants, 4 diagrams, and 56 maps. Longmans, Green & Co. 1947. 30/-.

Though primarily designed for university botany students, this book is also intended for all who are interested in plants. An Introduction is provided "for the benefit of the less scientifically minded," and the first three chapters deal with the general background of the subject.

The first part of the book is chiefly devoted to a descriptive review of the distribution of the flowering plants throughout the world. This occupies some 140 pages and deals in turn with families, genera and species. In one way or another the author contrives to present an exhaustive, and to a large extent numerical, analysis, incorporating much interesting information. It does not make easy reading, and will be of interest in direct proportion to the reader's own knowledge of plants and geography.

Other chapters deal with the history and distribution of the British flora, the distribution of the plants of Dorset, the geological history of the flowering plants, and the factors which influence distribution, the whole being rounded off by a chapter setting out the general conclusions. None of this should present any difficulty to the general reader, and will be found both interesting and informative.

The book makes no claim to originality so far as the bulk of its data is concerned; the author is meticulous about citing the authorities for his statements, and there can be little of importance missing from the 295 items in his bibliography. About 30 of the maps are original, but the remainder, like all the other illustrations, are drawn from other works. The book is, in fact, a synthesis from, and consideration of, the published facts and theories relating to plant-geography. In the main Professor Good presents a reasonable and well-balanced account, and in general his conclusions represent the modern view-point very fairly. However, the theory of "The Cycle of Distribution" put forward on pages 45-7, whilst no doubt true for some genera and species, does not warrant the claim to be "a fair picture of their general prospects," nor can one accept such sweeping statements as "The *genus* may, above all others, be called the natural category" (p. 19), and "the species has come to have a subjective rather than an objective meaning" (p. 20).

It is to be regretted that space has not been found for examples of different types of plant distribution with explanations worked out in detail, for this would have illustrated the importance of a detailed knowledge of geography. It is perhaps the one general weakness of the book that there is insufficient emphasis on the geographical background.

The author mentions that he has had to use many facts without checking them critically. This may account for the inclusion of *Codonopsis* and *Bergenia* among the "endemic" genera of N.E. Asia, and of *Daboecia* among those endemic to Europe (p. 117). Actually *Codonopsis* is widely distributed in eastern Asia with most species in western China and the Himalayas, *Bergenia* has four species in N.E. Asia and the rest (four or three) in westernmost China and the Himalayas, while *Daboecia* has one species in western Europe and another in the Azores. Incidentally, the wing in the fruit of *Scabiosa* is not an outgrowth of the ovary as stated on p. 295, but part of the involucre. Less excusable are the mistakes in the map showing the distribution of *Arbutus unedo* (p. 213), for this omits the stations in S.W. France, the one in Brittany, and the one near Sligo (which is actually mentioned in the text), so that the map gives quite an erroneous picture of the distribution of the species.

J. R. SEALY

CORRIGENDUM

The Editor very much regrets that owing to an error the block of Mulberries, Fig. 37 in the April Number illustrating The origin of the Black Mulberry was printed in an incorrect position. In order to rectify this, the caption should read as follows:

FIG. 37—The origin of the Black Mulberry

top: *Morus nigra* 2n = 308

centre: *Morus cathayana* 2n = 112 (left); 2n = 84 (centre); 2n = 56 (right)

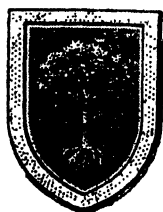
bottom: *Morus alba* 2n = 28

(All slightly enlarged)

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JOURNAL OF THE ROYAL HORTICULTURAL SOCIETY

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Part 6

June 1948

THE SECRETARY'S PAGE

Programme of Meetings.—Meetings and Shows during the months of June and July will be held on the following dates:—

- { Tuesday, June 8—12 noon to 6 P.M.
- { Wednesday, June 9—10 A.M. to 5 P.M.
- { Tuesday, June 22—12 noon to 6 P.M.
- { Wednesday, June 23—10 A.M. to 5 P.M.
- { Tuesday, July 6—12 noon to 6 P.M.
- { Wednesday, July 7—10 A.M. to 5 P.M.
- { Tuesday, July 20—12 noon to 6 P.M.
- { Wednesday, July 21—10 A.M. to 5 P.M.

On June 22 and 23 there will be a Flowering Tree and Shrub Competition for Amateurs. The Summer Fruit and Vegetable Show will be held in conjunction with the Show on July 20 and 21. On August 10 and 11 there will be a Hardy Flower Competition for Amateurs. Particulars and Schedules of all these competitions may be obtained on application to The Secretary, Royal Horticultural Society, Vincent Square, Westminster, S.W. 1.

At the Show on June 8 and 9 there will be a Pink Show, organized jointly by the British Carnation Society and the National Carnation and Picotee Society. Schedules may be obtained from the Hon. Secretaries of those Societies or from the Secretary of the Royal Horticultural Society.

Lectures—On Tuesday, June 8, at 3 P.M. in the Lecture Room, New Hall, the first of the two annual Masters Memorial Lectures will be delivered by PROFESSOR T. WALLACE, C.B.E., M.C., D.Sc., F.R.I.C., who will take as his subject, "The Nutrition Problems connected with Horticultural Plants," with special reference to Trace Elements. On Tuesday, June 22, also at 3 P.M., MR. W. E. TH. INGWERSEN, V.M.H., will lecture on "Rock-garden Plants."

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Linlithgow Library.

Demonstrations at Wisley—The following demonstrations will be held at Wisley during June and July, that on the second day being a repetition of the demonstration given on the first:—

Flower Garden

Wednesday and Thursday, June 2 and 3—Summer Pruning of Shrubs.
(2 to 4 P.M.).

Fruit Garden

Wednesday and Thursday, July 7 and 8—Summer Pruning of Fruit Trees (2 to 4 P.M.).

Kindred Societies' Shows—At the time of going to press the Iris Society intends to hold its Show in conjunction with the Society's Fortnightly Show, on June 8 and 9, but owing to the early season it is possible that this day may be changed. The British Delphinium Society will hold a Show in the Old Hall on Tuesday and Wednesday, June 22 and 23. The National Rose Society's Show will take place on Friday, July 2, in both Halls. The British Carnation and the National Carnation and Picotee Society are holding a joint Show in the Old Hall on July 6 and 7. Fellows' tickets will admit to all the above Shows.

The National Farmers' Union are holding the Hampshire Market Produce Show at Southampton on June 18 and 19. At this Show, fruit, flowers and vegetables will all be shown and there will be competitive classes for members of the Sweet Pea, National Rose, British Carnation and Fuchsia Societies and there will be a considerable amount of machinery and appliances for use in Horticulture on show.

Colorado Beetle—The Ministry of Agriculture and Fisheries asks that notice may be drawn to the danger of the Colorado beetle establishing itself in this country. Discoveries of the beetle in England and Wales in 1947 were far more numerous and widespread than ever before, and in view of the likelihood of further outbreaks in 1948 the need for vigilance is greater than ever since it is of the utmost importance that any outbreaks should be dealt with by the Ministry before the pest has time to spread or multiply. The Ministry is accordingly anxious to obtain as early notification as possible of the discovery of the pest in this country.

Any yellowish beetle with black stripes running up and down the beetle, not across, or any red or reddish-yellow grub that is found feeding upon Potato leaves should be regarded with suspicion. When grubs or beetles suspected of being Colorado beetles are discovered, specimens should be placed in a tin box (in which no holes should be punched) with a piece of Potato leaf and the box should be sent to the Ministry of Agriculture, Plant Pathology Laboratory, 28 Milton Road, Harpenden, Herts., with a letter stating the exact place where the insects were caught and the name and address of the finder. Nothing more should be done until instructions are received from the Ministry.

Chadwick Public Lectures—PROFESSOR FREDERICK G. GREGORY, D.SC., F.R.S., A.R.C.S., will lecture on "The Factors controlling reproduction of Plants" on Thursday, June 10, at 4 P.M. at The Chelsea Physic

Garden, admission free. Further particulars may be obtained from the Secretary, at the Offices of the Trust, 204 Abbey House, Westminster, S.W. 1.

Publications:

Botanical Magazine—Volume 165, Part 2 will be published early in June. Subscriptions for the whole of Volume 165 should be sent to the Secretary, Royal Horticultural Society, Vincent Square, S.W. 1. The subscription rate is £4 per annum post free.

Ornamental Flowering Trees and Shrubs—A reprint of the valuable report of the conference held in 1938 on this subject is now available, price 15s., postage 9d.

WISLEY IN JUNE

THIS month the collections and trials of herbaceous perennials form one of the chief attractions of the Gardens, while many June flowering trees and shrubs continue the great displays of May; with the flowers, newly unfurled leaves in many shades add delight to the scene, before their colours deepen as the summer lengthens.

Summer bedding in mauve and yellow with silver dot plants has replaced the Wallflowers and Tulips of the Spring in the formal beds near the entrance, while the Floral Trial Grounds are now planted with Dahlias, Chrysanthemums, and many annuals. The Bearded Iris are in full flower. Last year outstanding varieties included 'Arabella,' 'Fandango' and 'Maisie Lowe' (purple); 'Kashmir White'; the yellow 'Mabel Chadburn' and 'Joan Lay'; the light blue 'Lady Charles Allom,' 'Calixa' and 'Benbow,' one of the most beautiful colours to be found amongst these plants.

The early-flowering Belladonna varieties of Delphinium will be in flower in the Trial Grounds, and near the Alpine House the trials of Pinks and other Dianthus should be well worth a visit. The Lupin trials mentioned in a previous note will also be outstanding during the first part of the month; where these plants are grown in the herbaceous border the flower spikes should be removed as they fade, to prevent seed-formation and encourage a second display later in the summer.

The long Rose borders leading towards the Alpine House are commencing to flower, and several new varieties planted during the past winter are now included for comparison, while new beds accommodate the plants removed from the Rose walk. Near the collection of cordon Pears is a round bed planted with *Cytisus Battandieri*, a native of Morocco, which produces erect racemes of yellow, scented flowers, against a background of silvery leaves. It is quite hardy at Wisley, but the older plants tend to become rather gaunt with age, and replanting with seedlings will probably be necessary to maintain well-shaped plants in beds of this type.

Lower down the hill *Buddleia alternifolia*, trained as a standard tree, is wreathed in drooping sprays of small mauve flowers; unlike most popular Buddleias the flowers are produced on the previous year's wood

and any pruning required should be undertaken immediately the flowers fade.

The Alpine House contains many Campanulas, Lewisias, and the arching sprays of *Saxifraga Cotyledon*, together with the well-known *Rhodohypoxis Baurii* in several shades of pink and white, the white *Weldenia candida*, *Phlox mesoleuca*, and the mauve dragon's claws of *Phyteuma comosum*.

Outside the house the House Leeks (*Sempervivums*) are flowering on the small piece of rock-work devoted to the genus, and *Brodiaea congesta* is producing its compact heads of mauve flowers from bulbs which appear to spread annually in this part of the Garden and round the Laboratory walls.

Many genera are now at the height of their beauty in the Rock Garden; *Dianthus*, including the deep crimson hybrid 'Mars,' *Geraniums*, *Mimulus* by every stream side, and *Phlox* in many shades of blue and pink. Other outstanding plants flowering here include *Hypericum fragile*, with yellow flowers and grey foliage, *Genista lydia*, a low-growing, free-flowering yellow Broom, the prostrate *Anacyclus maroccanus*, covered with dazzling white Daisies, *Nomocharis aperta*, *Meconopsis quintiplinervia*, and near the ponds the bronze-tinted foliage and creamy spikes of *Rodgersia aesculifolia*, with the violet *Iris laevigata*, soon to be followed by the many varieties of *Iris Kaempferi*. Near the Wistaria-covered bridge, a new bed has been planted with a selection of the most striking varieties of the latter *Iris*, and while a great display of bloom cannot be expected the first year, sufficient flowers will be produced to give a good indication of the many different forms and colours now available.

The Wild Garden is carpeted with Candelabra Primulas; *P. japonica*, naturalized in large masses, sows itself freely, while groups of the pink forms of *P. pulverulenta* provide a pleasing contrast; others include the golden-flowered *P. helodoxa*, *P. chungensis*, and the hybrid *P. 'Chunglenta'*. These are followed by the giant Himalayan Cowslip *P. Florindae*, *P. sikkimensis*, and the hanging mauve and white bells of *P. alpicola* and *P. alpicola* var. *alba*. A number of interesting shrubs are also flowering here, including *Kalmia latifolia* with large clusters of saucer-shaped rose flowers, *Magnolia sinensis* and *M. Wilsonii*, whose hanging white blossoms are enhanced by the cluster of crimson stamens at the centre. A small tree of *Styrax japonica* forms a delightful picture when viewed from below with its freely-produced Snowdrop blossoms hanging from slender twigs.

In the Heath Garden no fresh *Ericas* are conspicuous this month, but a number of the shrubs planted here are in full flower, particularly *Genista cinerea*, a native of S.W. Europe, with masses of yellow flowers, and the widely grown *Spartium junceum* which continues its display until September.

Seven Acres contains a number of flowering shrubs, but the main display of *Berberis*, *Chaenomeles* and flowering Crabs is now over and the chief points of interest are provided by such plants as the North American 'Fringe Tree' *Chionanthus virginica* and the red Magnolia-like 'Allspice' *Calycanthus floridus*, often known as the 'Beer Tree' from

the scent of its blossoms. Here also will be found *Magnolia virginiana*, a semi-evergreen which produces deliciously-scented globular flowers over a long period.

A pleasant walk by the river leads to Howard's Field where many Rose species, Cistus, and Helianthemums are in flower; all these shrubs thrive on the extremely light and sandy soil of this area of the Gardens.

Returning through the Pinetum, to the herbaceous Borders, where the first flowers are now appearing, visitors should inspect the collection of *Tradescantia virginiana* varieties flowering beneath the old Apple trees and the large bed of Herbaceous Phlox, before entering the Viburnum collection where *V. Sargentii* and the long horizontal branches of *V. tomentosum* var. *Mariesii* set with white flower heads, each surrounded by a ring of prominent sterile blossoms, form an outstanding feature.

In the Award of Garden Merit Collection *Gillenia trifoliata* is in flower amongst the herbaceous perennials with the brilliant blue *Anchusa azurea* (*A. italica*).

On the wall near the potting shed *Lonicera Tellmanniana* is producing masses of outstanding orange-yellow blossoms, while small plants of *Fremontia mexicana* are just coming into flower.

In the Temperate House the many hybrid Fuchsias are conspicuous, with the golden blooms of *Cestrum aurantiacum*, and the grey-green foliage and royal purple flowers of *Tibouchina semidecandra*.

Round the Laboratory walls many of the less hardy climbers have been replanted, and several of these plants are already producing flowers, including the red and yellow *Abutilon megapotamicum* (*vexillarium*) and *A. Milleri*, while over the brick arch at the north end a large plant of *Jasminum stephanense* is covered with sweetly scented pink blossoms.

The Vegetable Trial Grounds in Wisley village are of increasing interest as the crops reach maturity. During this month an invited trial of Cauliflowers, sown under glass in the early spring and planted out in April, will be forming their curds, and Lettuce sown in frames in November should be well hearted early in this period; late Peas are also on trial. With these will be found a large variety of vegetables grown for the Seeds Import Board.

The Vegetable Grounds are open for inspection on weekdays during normal working hours, but they are closed on Saturday afternoons and Sundays.

SHRUB ROSES FOR THE MODERN GARDEN

G. S. Thomas

THE progress of hybridization along certain lines in the genus *Rosa* is popular with the majority of rose growers the world over, and we are at last beginning to see the brilliant colours and perpetual habit of flowering linked with sturdy growth and scent in some of the latest kinds. The long process of building up a special type such as the H.T. which has been going on since the advent of the China Rose 150 years ago, is now beginning to be realized and much the same might be said of the Polyanthas. Adherents of these modern strains will thank MR. BERTRAM PARK for his interesting article in your January issue, in which he picked out many "winners" about to come on to the market.

Modern roses are, however, but a specialized part of the vast number of species and their separate groups that make up this huge and delightful genus, most kinds of which are particularly suited to present-day gardens, being trouble-free and long lived. As one of the "fond few" who, as MR. PARK mentions, wish to resuscitate the old roses I should like to ventilate the whole subject of roses, and to make a reply to his article. In doing so I would like to remind MR. PARK that, while he no doubt represents the majority of rose lovers to-day, these modern rose lovers only see the rose from the inside of their narrow circle, and they are but the "fond few" of the greater world of horticulture.

Breeding in nearly all of the great specialized groups of plants has occurred haphazardly in the past, and both breeding and selection have proceeded along stereotyped lines. The usual result is a long string of varieties which are gradually superseded by later productions. This evolution of the majority of the "grandifloras" of horticulture can scarcely remain stereotyped if science is brought to bear in hybridization. In fact, the outlook is almost alarming when one considers the potency of colchicine. Therefore we may expect radical changes of style among roses of the future, although we may for a long while regard the H.T. as a special period style and the favourite of many. Possibly because roses have been favourite flowers from time immemorial, and also because certain species were natives of the Eastern Mediterranean region and thus have been grown in the gardens of cultured people for thousands of years, the genus *Rosa* has already had more attention paid to it by gardeners than any other genus of hardy plants. It is not a case of simple selection of one species or another, but of a series of complex hybridized groups of roses, each much prized in its heyday, and some of them eventually being linked together in our modern roses. Those who give Dame Nature credit for some perfection will agree that selections from one species have a claim on our attention, while early hybridized groups will also have a historic interest. It will be shewn later that in addition to an interesting history these plants also have a high claim for recognition in horticulture.

Now, it has not yet been my good fortune to find a "modern rosarian" with any appreciation of the genus as a whole. But I can say that the many I have met who appreciate rose species or the older groups of hybrids recognize their intrinsic value because they see horticulture as a whole. Let us here and now decide what an "old" rose is,

for while everyone knows the modern rose, I find that very few know what constitutes an "old" rose. Most people, including MR. PARK, think it means any rose that is "out of date." That is why he compares them with STEVENSON's "Rocket." His "G.W.R. masterpieces" are improvements on STEVENSON's "Rocket" undoubtedly, but to compare a modern rose with an old is like comparing a cinema organ with a flute, or a technicolor film with a water-colour; there simply is no comparison.

The determining factor in old roses is the advent of the China and the Tea Roses. There are all sorts of exceptions and confusions, but broadly speaking these two species destroyed the old roses, and particularly the China rose, for it brought in the perpetual flowering habit. The old roses represent a perfection of style evolved from a handful of species of decided characteristics. Leaving aside the great groups of Scotch, Sweet Briar, Rugosa and Austrian Roses (many of the hundreds of varieties of which are old, and have been evolved from one species) let us briefly recall, with the help of DR. C. C. HURST's excellent records, the history of the Bush Roses of the last centuries.

The Dog Rose (*R. canina*), the French Rose (*R. rubra* or *gallica*), the Phoenician Rose (*R. phoenicea*), and the Musk Rose (*R. moschata*) are the four important ancestral roses. In their several ways they came together, probably thousands of years ago. The French and Phoenician produced the Damask Rose (\times *R. damascena*) and the Damask with the Dog Rose gave us the White Rose of York (\times *R. alba*), while the French and the Musk gave us the autumn-flowering Damasks (\times *R. bifera*). Of the latter I have as yet found none, but linked again with the White Rose they produced the Cabbage Rose (*R. \times centifolia*), and from these sprang the Moss Roses. It is therefore not surprising to find that some Moss Roses do flower again in the autumn. For otherwise the above roses flower but once, in the summer, and they produced what we may call a dynasty of summer flowering roses of varying types, yet all varying within a circle of common characters, which lasted until the nineteenth century. In the sixteenth century *R. chinensis*, the China Rose, was reported from the Far East, and its subsequent introduction towards the close of the eighteenth century to this country and to the Continent, together with the Tea Rose (*R. gigantea*), rang the knell of the old rose groups.

It was many years before the influence of the China Rose was felt. In fact many of the best "old" roses were raised in the late nineteenth century. This may seem a contradictory statement, but long before their English competitors had awoken to the supreme beauty of the rose, the Dutch and French nurserymen were busy raising roses along the *stereotyped lines of the day* (eighteenth century) arriving at a rare height of perfection some fifty years later, and only gradually were the China and Tea brought into use. In a rose collection of, say, 1840 we might find therefore parallel novelties, some in the approved style and others shewing affinity with the new species. The result of this gradual new mixing of species gave rise to the Bourbons (*R. borboniana*) and Hybrid Perpetuals, both mere footstools—and in the main unworthy ones—for the newer Hybrid Teas, later to be infused with the Austrian and all sorts of other roses to give our modern strains. Those Hybrid

Perpetuals were undoubtedly the STEVENSON's "Rockets" among roses! The period pieces among the roses were left behind in the march of progress for the same reasons that CHIPPENDALE chairs and MOZART sonatas gave place to other styles in keeping with the day.

That the new roses are an "improvement" on the old will now, I hope, appear as an untenable idea; that the "new" colours are better than the originals is no truthful statement for any colour is as beautiful as the next except by comparison or association. Moreover, no modern rose makes that lovely pattern of flower and foliage found in the species and ancient hybrid groups. To our senses, sated with the brilliance of modern flowers, the old roses' soft colours—pink and mauve, purple and white, and light and dark crimson—may appear dull. But like the best wines, these colours are an acquired taste, and all who grow the old types soon glory in their velvety softness, especially among the purples. That the old roses are lacking in constitution will also be refuted, since it is the oldest roses that are with us, and those thousands upon thousands of early H.P.'s that have gone—many scentless and few of any character, if the descriptions are to be believed.

I have seen and grown Gallicas up to 4 feet and Damasks and Mosses up to 5 feet high and through, loaded with blossom. They are mostly fine bushy flowering shrubs of splendid constitution, well clothed with foliage, giving abundant blossom of wonderful form and with an unforgettable *sweet* scent in June and July, frequently followed by ornamental hips later in the year. Their scent I repeat is sweet—so rosy-sweet that many moderns appear sharp by comparison, as do their pointed contours. The fact that their flowering period is at best a matter of five or six weeks need not deter us. The same is true of most of our best flowering shrubs, but by planting for succession continuity is secured. We would not forgo the pleasure of *Ceanothus rigidus* simply because 'Gloire de Versailles' flowers for three times as long. Let us not therefore forget these stalwart heirlooms of the past.

Their survival for many decades in the face of heavy competition must be put down to misuse and ignorance, not deterioration and lack of vigour. It is amazing how these fine flowering shrubs are misunderstood, particularly in the matter of pruning. They need to have their old twiggy wood removed—often complete branches from the base—*immediately after flowering*, to enable them to put all their late summer strength into long new branches. These will give abundant short shoots the next season bearing flowers; sometimes the tips produced in the autumn need shortening in the spring. That is all the pruning that is required; the treatment is as for any other early summer flowering shrub. Yet if one visits some of our big public gardens one finds them pruned hard back in spring, as prescribed for H.T.'s! This treatment simply removes the flowering shoots. The result is a few, somewhat bigger, later blooms, huddled away inside the bush, and surrounded with luxuriant growth. The chief joy of these old roses is the abandon with which they produce their clusters of flowers along the arching stems, creating a mound of blossom. Their hardy nature enables them to thrive in almost any soil, especially by their suckering tendencies when on their own roots. Although they will thrive on poor soils, it is

only fair to add that they are incomparably more prolific, richer in colour, and more sumptuously bedight in good, well-dug loam, for they are worthy of the best we can give them.

Having outlined the botanical approach, and assessed the garden value of the old roses in general, we will now examine the various groups for colour and variety, to justify the claims made for them.

It is not surprising to find, in plants that have been at the mercy of botanists and gardeners for hundreds of years, an involved synonymy. The French Rose is no exception. Alternatively known as the Rose of Provins (where it was used for the making of preserves) it must not be confused with the Provence Roses (*R. centifolia* or *provincialis*). It is correctly *R. rubra* of BLACKWATER, but it is likely to remain amongst gardeners as *R. gallica*, and the varieties grouped under it are usually referred to as "gallicas." There are single pink kinds, but the most usual semi-double form is often called 'Red Damask' (*R. gallica maxima*) adding still further to the confusion, for it has nothing to do with the Damask group. This is the vivid light crimson, loose flower which, with its brilliant "sport," *R. gallica versicolor* ('Rosa Mundi'), makes such a dazzling picture in almost every garden where the ancestral roses are grown. This, FAIR ROSAMOND's Rose, is often known as 'York and Lancaster,' but can at once be distinguished. The latter has flowers wholly white, or pink, or particoloured; 'Rosa Mundi' is crimson, splashed and striped with pink and is moreover the better and more free-flowering plant (Figs. 55 and 61).

The Gallicas do indeed form a wonderful group. Their firm neat foliage and generally erect stems bearing few small prickles, are thickly beset with short glandular bristles beneath the flowers, which are borne erect, singly or in twos or threes, and are mostly many petalled and flat when fully opened. Their yard-high hummocks can be covered with striped, spotted, blended or self coloured flowers. The only spotted varieties that I feel at all sure about are 'Alain Blanchard' with semi-double crimson-purple flowers, spotted with a paler tint, and 'La Plus Belle des Ponctuées' in warm pink, heavily spotted with light pink. Both reveal the cup-shaped petal formation, and shew golden anthers.

Among the striped varieties much confusion reigns, and I do not feel competent to embark upon the 'Village Maid' group. One of the smallest and neatest striped kinds is 'Georges Vibert' (1853), a slender bush up to 3 feet, with very small narrow foliage and flat, double, many-petalled blooms in light pink striped with crimson. 'Camaieux' is one of the real glories and my favourite stripe. It is a neat bush again, and its big loose blooms are vividly striped on a white ground with crimson purple, fading with age to a slatey Parma violet at which stage it is of very subtle beauty.

The gallicas are rich in these purple tints; 'Hippolyte' is one of the neatest and richest and a true miniature; 'Tuscany' shews a golden eye in its crimson purple velvet, but is an exception to the general run in having little scent. It is none the less an ardent colonizer and first-class garden plant, thriving in MR. A. T. JOHNSON's garden in North Wales in shaley soil to perfection. 'Charles de Mills,' whose petals are so regular and flat that they appear close-cropped, is a unique variety

with a rich combination of crimson and purple, and blood-red; it needs a good strong soil. Possibly the most famous of the purples is 'Cardinal de Richelieu' (1840) whose dusky purple ball-like flowers have the bloom of a grape on the serried ranks of rolled petals. This is a magnificent bush up to 4 feet high and through, and always well furnished. Bringing to the purple tones puce and brown and other tints is the remarkable large flowered 'du Maître d'École' with huge, flat, full-petalled blooms on a fine shrub up to 4 feet.

Our Old Red Gallica (often called maxima) holds the field amongst the reds for I know none to equal it, but there are several fine pinks, one being that lovely kind that may be rightly called 'Empress Josephine' (Fig. 60). It has the loose lovely petals associated with maxima, beautifully curved and veined in a soft deep pink, and is the most gracious of all. A perfect miniature bright pink is 'Petite Orléannaise'; there is a dainty, clear, blush-pink called 'Belle Isis'; while 'President de Sèze' has a great depth of lilac pink in the centre of its double flowers, and fades at the edge of the open flowers to lavender white.

Names throughout these notes must be treated with reserve. Nobody is certain about the names of these old roses, but I have checked all the names mentioned with old writings and have at least satisfied myself that they are not wildly wrong. It is always easier to say "that's *not* so and so" rather than "that *is* so and so"; but by constant checking and comparison I hope I have my collection tolerably right. Other growers' help is constantly sought and always appreciated.

Leaving those few kinds to serve as an introduction to the gallicas let us now consider the Summer Damasks (*R. gallica* × *phoenicea*), since the Phoenicean Rose does not seem to have left us any varieties. The best known kinds are 'York and Lancaster,' 'Kazanlik' and 'Blush Damask.' The first we have already discussed under *R. gallica maxima*; it is interesting but not a worthy garden plant, and it does not require much effort to see its affinity to 'Kazanlik' (*R. damascena trigintipetala*) which is much prized in the Balkans, being the main source of 'Attar of Roses.' Both these varieties have the mixture of large and small thorns, large drooping *pale* green leaves and rather loose blooms with short petals, borne in small clusters on weak drooping stalks. 'Kazanlik' is practically a pure pink 'York and Lancaster,' and the plants I received as 'Prof. Émile Perrot' appear identical with it. MISS JEKYLL's favourite 'Blush Gallica' (correctly Damask) comes here with multitudes of small drooping mauve-pink blooms; this, with other Damasks, seems to tolerate dry soils very well.

'Madame Hardy' (1832) as I know it (Plate 14 in BUNYARD's *Old Garden Roses* depicts the same thing, but not Plate 31), is a superb Rose, and, I would add, the best white amongst the old roses (Fig. 64). The foliage is of a dark green and throws up the purity of the perfectly formed flowers to advantage. Borne singly or in clusters these are at first very faintly tinged with flesh, but open to pure white, very full, of cupped formation, eventually reflexing their outer petals. It is a flower that at once appeals even to those who are not acquainted with the old roses, amongst which it has no peer. With it I will group 'Koenigin von Danemark' (1898) (Queen of Denmark) whose grey foliage is

probably derived from an alba parent; this I should place at the head of all pink old roses. Of the same hearty growth and full flowers as 'Madame Hardy,' this is a most brilliant clear pink, in fact the half-opened blooms reveal a hint of vermilion which delightfully fades to blush at the edges when fully open.

Sweetly scented as are almost all of these old roses, the alba scent is noticeable in 'Queen of Denmark' for of all rose scents I find this the purest and sweetest and it is easily recognizable. Perhaps our own sweet Dog Rose was the giver of this amazing concentration, for it will be remembered that *Rosa canina*, with the Damasks, gave rise to *R. alba*, the White Rose of York. The stalwart stems of 6 feet or more, sparingly set with large hooked thorns, pale green wood, and hard leathery grey-green leaves are noticeable characters of this group.

There is a lovely semi-double white, *R. a. semi-plena* (Fig. 56); and the 'Great White' *R. a. maxima*, whose fine creamy-centred flat double blooms and grey leaves make such a picture on the soft coloured stone walls at Nymans, COL. L. C. R. MESSEL's famous garden in Sussex. It is known also as the 'Cheshire Alba' by gardeners in that district. 'Great Maiden's Blush,' perhaps the most ineffably sweet-scented of all roses, is of equal vigour, and a planting of this with a purple gallica in front of it remains a lovely memory, for its blush-pink blooms, creamy at the edges round their tousled warm heart, seem just the right tint for the combination. 'Small Maiden's Blush' is an exact counterpart, half as high, with blooms only slightly less than its sister's four-inch width. I think I have at last found the true 'Madame Audot' which may be called a superlative 'Maiden's Blush.' Again with grey foliage, 'Céleste' ('Celestial') has in the depths of its shapely bud a warmth of rich pink, and opens, few petalled, to a pure self pink, very tender and soft. This is a fine compact bush up to 5 feet or so. A miniature lilac-pink variety is 'Pompom Blanc Parfait' whose blooms are borne all the way up lanky stems of 4 to 5 feet. These alba varieties have more quality than many old roses and are undoubtedly in the first rank of flowering shrubs; their floral display and the abundant hips of several kinds allow them to assort well with most garden schemes and ensure colour twice a year.

Our remaining ancestral rose is *R. moschata*, an enormous climber—with a languorous scent, very "free on the air"—which therefore does not come within the scope of these notes, but it will be recalled that this species, crossed with the French Rose, gave us the Autumn Damasks and that these, crossed again with the White Rose, produced the Centifolias (Provence or Cabbage Roses).

Just why these should be called Cabbage Roses I cannot say. Few of them resemble that worthy vegetable more than any other Rose, although they have, to justify their title, many petals. Anything less cabbagey than *Rosa centifolia* itself would be hard to find; this open growing rather lax bush with thorny and glandular stems and large, drooping, coarsely toothed leaves, bears beautifully shaped pure pink double blooms on drooping stalks, and was a favourite with the Dutch floral painters. This rather loose vigour is found in most centifolias and their sports, the Moss Roses. Almost identical with the type is

R. c. cristata, the so-called 'Crested Moss' (1827)—though it has nothing to do with the Mosses—or 'Chapeau de Napoléon,' on account of its cockade-like frill of green at the edges of the sepals (Fig. 65). Another variant is the Lettuce-leaved Rose, *R. c. bullata*, beautifully figured in REDOUTÉ and in MISS WILLMOTT's *The Genus Rosa*. There is a white 'Unique Blanche' (1778); its rather poor flowers appear late, with many narrow creamy white petals. Not many centifolias have come my way, but one is a really grand plant, called 'Tour de Malakoff' (1856). This vigorous bush, which I have seen 6 feet high and covered with its great 5-inch blooms, has a most amazing mixture of colours; the half-opened blooms filled with petals of unusual texture, are cerise, carmine, and open to rich carmine veined and shaded with rich purple, and fading at the edges to mauve pink. The foliage is good, neat, and of fresh green, and I place this plant very high as a flowering shrub or for rambling over a low fence or stump (Fig. 63).

R. centifolia is rich in miniature types. The neatest is the fastigiate, dark-leaved 'Burgundy Rose,' *R. centifolia parvifolia* (*burgundiaca*, or 'Pompon de Bourgogne'), with inch-wide rosette-blooms in carmine pink (Fig. 58). This can be effectively used as a small hedge. 'De Meaux' (1814) and 'White de Meaux' are pale-pink and white-with-a-pink centre respectively, and make charming small bushes up to about 2½ feet with light green neat foliage; a size larger is 'Spong' in true centifolia-pink, while 'Petite de Hollande' is again a size larger, half-way to centifolia. Its twiggy bushes, well clothed in leaves, can be covered with dainty blooms for weeks if pruned every year after flowering. These miniatures do certainly respond well to the removal of all spent twiggy shoots annually.

The Moss Rose (*R. centifolia muscosa*) appeared probably in Holland prior to 1720 and was a sport of *R. centifolia*; this, the 'Common Moss,' like 'Chapeau de Napoléon' is a charming addition to our centifolias. The "moss" is due to an almost leafy enlargement of the sepal-wings and glands. A white hybrid is 'Blanche Moreau' (1880), delightful with its brown-green moss, while the 'Striped Moss' is a sport, and a charmer for those who appreciate its carnation-like beauty in pink and crimson. Still keeping to the centifolia tradition is 'Eugène Verdier' (1872) in brilliant cerise crimson, a tall bush up to 5 feet, and the vivid clean pink 'Jeanne de Montfort' (1851). The latter has the largest trusses of blossoms I know and is heavily mossed. The big flat blooms are very sweet. 'Mousseline' (1880) and 'Comtesse de Murinais' (1843) are dainty blush varieties. The largest and most lax of all is the superb 'William Lobb' (1855) whose 8–10 feet branches, heavily mossed, display so well the clusters of big cerise-pink blooms turning to slate grey. This is a grand plant for associating with pale yellow Hybrid Musk Roses and the old Rambler 'Goldfinch.' The last of our typical varieties shall be two small purples, 'Captain Ingram' and the dark-as-night velvety maroon-purple 'Nuits de Young' (1852), two of several gems I have received from MRS. CONSTANCE SPRY's collection.

The arrival, some time after the sporting of *R. centifolia muscosa*, of a single pink Moss—no great garden capture, but, a dainty pure

bloom—enabled quantities of Moss varieties to be raised from seed. I am not claiming that the above varieties were all sports but amongst the varieties I have seen they do conform to the parent type, whereas the following are stiffer bushes with more sophisticated blooms. For pale pink we have the immense globular 'Gloire des Mousseux' (1852); 'Baron de Wassanaer' (1854) and 'Eugénie Guinoisseau' (1864) in bright mid-pink; 'Crimson Globe' (1890) speaks for itself and, among crimsons, 'Capitaine Basroger' (1890) is a very vigorous and richly coloured variety. But none of these to my mind have charm. They are, moreover, rather prone to mildew and are much less desirable than others in these notes. 'Deuil de Paul Fontaine' (1873) is a variety which seems to have lost its vigour, but its colour, crimson, brown, purple and black, remains unimpaired. A curiosity for this group is *R. c. muscosa japonica*, whose moss extends all the way down the shoots on the leafy stalks, midribs, and also on the surface of the leaves. It is strong growing and has flat crimson-purple blooms with grey shading. 'Golden Moss,' raised in the '30's, seldom flowers. A number of these varieties throw occasional autumn blooms in good soil and in moist weather, an inheritance from the Autumn Damasks.

In our review of some of the principal kinds of the four great groups of ancient roses dates of origin have been given where available. It is obvious that a number of the oldest forms had their origin long before horticulture, as we have known it, was visualized. New Moss varieties have been raised during recent years and I look forward to seeing them. Damasks have been crossed with modern roses. I am anxiously awaiting the first blooms of 'Oratam' (1939), a Damask \times H.T. from the U.S.A., and the most improbable crosses have been made amongst divers kinds, but generally speaking I think breeders would be best advised to leave well alone; in other words to leave the old types as they are and use their skill in raising fine garden shrubs along the lines of the Hybrid Musks.

Without wishing to suggest that these notes constitute a complete review of all garden roses other than our present-day favourites, I should like to call attention to some old groups which were being developed with the infusion of China characters with the more recent old roses.

Leaving the Noisettes, being climbers, but amongst which 'Champney's Pink Cluster' (c. 1804) can be very lovely as an established plant, we come to the Bourbons (*R. chinensis* \times *damascena* \times *R. borboniana*). The foliage at once shews a marked difference. The smooth limp leaves and warm tinting of the young shoots and prickles recall the Chinas, and indeed from this wonderful plant they get their perpetual flowering habit and neatly cupped blooms, filled with shell-like petals. I have not seen the original Bourbon, a chance hybrid found on the island of that name off the coast of East Africa in 1817, but 'Mme. Pierre Oger' (1878) will serve as a pattern, although a comparative new kind. The photograph in BUNYARD's *Old Garden Roses* will do more justice to the dainty grace of this real treasure than my pen. The fresh green leaves are of the right quality to contrast with the cream-pink shell-like petals forming a globular flower, gradually turning to deep rosy pink where exposed to the sun and light, during its week's

existence. 'Louise Odier' (1851) is larger in all parts and makes a more sturdy and well-filled bush with soft lilac-pink flowers. (These two varieties prove how well certain roses will thrive in the poor sandy soil along the double rose borders at Wisley; many a modern, too, has there found a medium to its liking and provides annually a surprising display, and I understand the borders have received no fertilizer or manure for years.) A China Rose that fits here, being a reversion towards the Bourbon style, is 'Hermosa' (1840), which occurred independently, DR. HURST tells us, with four different breeders. The blue-green neat leaves and cupped soft pink blooms make it still popular.

Two handsome striped Bourbons are 'Commandant Beaurepaire' and 'Honorine Brabant.' The former is often classed as a gallica, but since it has obvious leanings to the China varieties, from its leaves and its occasional later blooms I prefer to class it here, and Honorine is identical except in colour. They both make fine leafy bushes up to 5 feet or more, and bear typical cupped blooms; the Commandant is rich crimson with carmine and purple spots and stripes, while Honorine is pale lavender-pink with deeper markings and particularly lovely in the autumn.

Other magnificent climbing and pillar Bourbons are 'Blairi No. 2' (1845), 'Mme. Isaac Pereire' (1880) (one of the most powerfully scented of all Roses), 'Mme. Ernest Calvat,' and the famous 'Souvenir de la Malmaison' (1843) (a parent of that worthy favourite 'Gloire de Dijon') and 'Zephyrine Drouhin' (1868). The latter is thornless and its loose vivid silvery pink blooms are very fragrant and only less lovely than its paler sport 'Kathleen Harrop' (1919). Concurrent and later developments with large flowers merge into the Hybrid Perpetuals. I must mention here that those who despair of growing the H.P. 'Roger Lambelin' (1890) after reading MR. BERTRAM PARK'S remarks, may take heart for I have seen it in MR. A. T. JOHNSON'S garden 5 feet high in poor shaley soil. Its strangely shaped petals of crimson edged with white are admirably portrayed in *Roses of the World in Color*, by J. HORACE MACFARLAND. This has no more lost its vigour than any other old Rose, providing its wants are understood, and I think the greatest of these is to be left alone in fair conditions with a minimum of pruning, and this applies to all these larger bushes. It must be borne in mind that the perpetual Bourbons and others of their type require to be pruned in the spring, although removal of twiggy weak wood will help at any time.

Two other H.P.'s deserve mention here, principally my own favourite 'Reine des Violettes' (1860) to all intents a soft-leaved gallica in velvety lilac-purple, sweetly scented, and perpetual flowering. 'Fantin Latour,' a wonderful sight in COL. F. C. STERN'S garden on the Sussex coast in July, is a very vigorous rounded bush bearing a smother of pale pink, loosely double, flat blooms. It has not yet flowered in the autumn with me, and should possibly be grouped with the Bourbons. MISS SACKVILLE WEST'S treasured 'Souvenir de Dr. Jamain' of dusky dark purple must not be forgotten, nor 'Paul Perras,' a free flowering, very perpetual, warm pink variety.

'Cecile Brunner' (1881) and 'Perle d'Or' (1884) were two of the very first Hybrid Polyanthas raised and are worth growing for their really

exquisite tiny buds. It is amusing to see how far this race has gone. These two are real buttonhole gems in Ophelia-pink and soft creamy orange respectively. I have three types of 'Cecile Brunner': one is a bush up to 3 feet or so, another throws up the most lovely sparsely leaved flowering sprays in the autumn, and a third is a true climber.*

The 'Old Blush' is the most popular of all the Chinas. The HON. ROBERT JAMES grows this to perfection at Richmond, Yorks.; his beds are neighbours to others containing the purple Heliotrope, a delightful contrast to the clear pink of the rose, especially against the dark yew hedges. 'Fellemburg' (1857) is a grand shrub in light crimson, with similar large clusters of blooms. The two singles—'Miss Lowe,' pink turning to dark crimson, and *R. c. mutabilis* ('Tipo Ideale' or *R. turkistanica*) whose flame buds, chinese-yellow young blooms, coppery pink at maturity, create such a surprising blend of colours—need all the sunshine available and shall close our list of these perpetual groups.

Several isolated Roses must be mentioned. \times *R. Dupontii*, a fine large shrub up to 6 feet high and through, combines the good points of *R. moschata* and *gallica*, and bears single cream-pink fragrant blooms of Tudor shape amongst pale green foliage. The Sweet Briar has left us a double white, and a double scarlet ('La Belle Distinguée'), a neat bush of some 3 feet bearing soft rosy red tightly double blooms. In addition to these double forms there is a cupped creamy white one, 'Hebe's Lip,' whose crimson edges denote an early use of lipstick; this is a Damask hybrid and is a small bush of considerable charm early in the season (Fig. 71). The Scotch or Burnet Roses reached their zenith in the first half of the last century, and many doubles and singles grow happily in old gardens of to-day, mostly without labels. They are wonderful colonizers, especially in light soils, and form trouble- and weed-free thickets bespangled with sweet little flowers in April and May in the South. One of their greater developments is 'Stanwell Perpetual,' possibly a cross with an Autumn Damask, thriving in almost any soil and producing its flat double blooms—large for a Burnet Rose—from mid-May to October. They are of light blush-pink and deliciously fragrant. The American \times *R. Harisonii* (*R. foetida* \times *spinosissima*) brings us our first thought of yellow. The brilliant canary yellow rosette-blooms in May (all these Burnets flower before one is ready for them!) are borne on long wands if pruned after flowering.

Rosa hemisphaerica, a double yellow rose that thrives on a hot wall at Highdown, was the despair of the earlier rosarians. It is a shy and fleeting bloomer in double yellow. Judge then the welcome that was accorded to the 'Persian Yellow' (*R. foetida persiana*), brought from Persia in 1837. Here was the first double yellow Rose, apart from the small flowered Burnets, suitable for most southern gardens. The typical Austrian Briar foliage in parsley-green, widely toothed, distinguish all of this group; *R. foetida* itself is of vivid sulphur yellow and the Persian double is as brilliant, but apt to "ball" in damp weather. Apart from their share in the production of Pernetianas and H.T.'s, the Western Asian *R. foetida* (so called the Austrian Briar) has also

* In addition to these, MR. MURRAY HORNIBROOK grows a dainty lemon-white sport in his garden in France.

given us lovely early flowering bushes and climbers such as 'Star of Persia' (1919), 'Rustica' (1929), 'Le Rève' (1923), and the sister seedling we are calling 'Hidcote Yellow.' 'Persian Yellow' has produced a remarkable Rose with *R. rugosa*, named 'Agnes' (1900). An erect and thorny plant, this hybrid is a welcome addition to double pale yellow shrub roses and often produces late blooms.

A precious heritage is *R. virginiana plena*. This variety of the American species (which used to be called *R. lucida*) was raised in 1768 in this country. It is known also as 'St. Mark's Rose' or 'Rose d'Amour.' The typical shining foliage turns to red in the autumn and in July shews up the shapely buds, seldom opening fully with us, of deep pink. It is a flower of great charm.

Our last rose is a well-known intruder; it is the understock called *R. multiflora* 'De la Griffériaie' (Fig. 62). In some gardens it is treasured as an ancient Rose, and so it well may be, for it is by no means pure multiflora, and its occurrence is often due to its strong growth throttling the variety budded upon it. It is a pillar rose or large sprawling bush with an unparalleled display of bright cerise-crimson double blooms in clusters fading to a soft mauve-grey. The foliage, flowers, and scent resemble the old groups. Hard pruning is well repaid, and allows it to make up in display what it lacks in quality.

And what of the future? Can we visualize races of stalwart shrubs with fragrant flowers of all colours, including the purple tints that assort so well with the whites and yellows, coupled with perpetual flowering? I think so; the day is possibly coming when Rose beds as we know them may give place to something better furnished in winter and spring. Certainly there are rose species, whose beauty is as yet practically untapped by the hybridist, which may change the Rose as the China did; witness 'Mermaid,' and 'Schneezwerg' (*R. bracteata* crosses) and 'Nevada' (*R. Moyesii* cross). Let us hope that the redolence of the gallicas' and centifolias' leaves and stems will be bred into the new races, for sake of the fragrance left on one's hands after a half-hour's handling of these flowers. And, when eventually sated by the changes rung by the hybridist, let us not forget the species themselves, so fresh in their natural beauty, and so easily managed in the garden.

It is hard work making a collection of old Roses or compiling notes. There is so much to be done in old gardens and so much to be read in books that one may spend a lifetime and still be only beginning. It is surely high time that a concerted effort should be made to gather together a collection of all the old varieties which are of garden value, before names become hopelessly confused or lost.

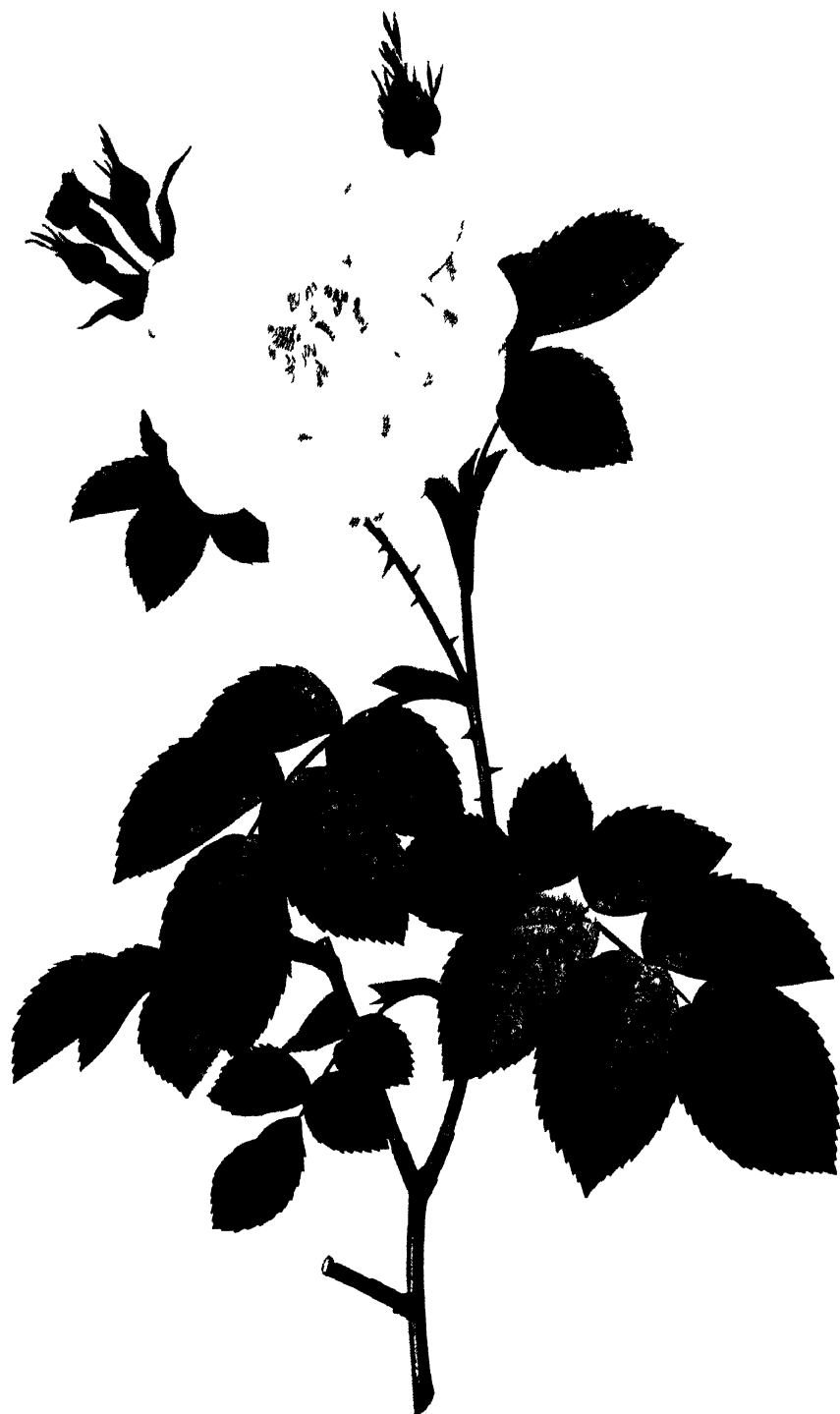
A NOTE ON THE ILLUSTRATIONS OF ROSES

F. M. G. Cardew

THE plates with which the foregoing article is illustrated are reproduced from two great Rose monographs separated from each other by just a hundred years—PIERRE JOSEPH REDOUTÉ'S *Les Roses*, published in parts in Paris between 1817 and 1824, and ELLEN WILL-



110 55—*R. gallica* *versicolor* 'Fair Rosamond's Rose' or *R. gallica* 'Rosa Mundi'. This should not be confused with 'York and Lancaster' [from Redoute, *Les Roses*, I. 135-1819] (See p. 173)



IG 56—*Rosa alba flore pleno* Now known as *R. alba semi-plena*, to differentiate it from the more fully double kind [from Redouté, *Les Roses*, I. 117-181b] (See p. 175)



FIG. 57—*Rosa gallica rosea flori simplici*. The single pink ancestral type
[from Redoute, *Les Roses*, 3: 57 1822]



FIG. 60—*R. gallica* 'Empress Josephine' *R. bowdiana* 'Kathleen Harrop' in Colonel Messel's garden of old-fashioned roses, Nymans, Sussex (See p. 174)

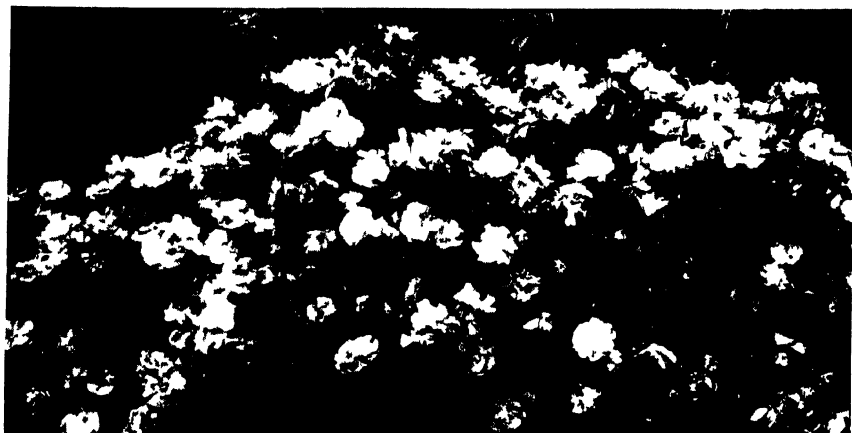
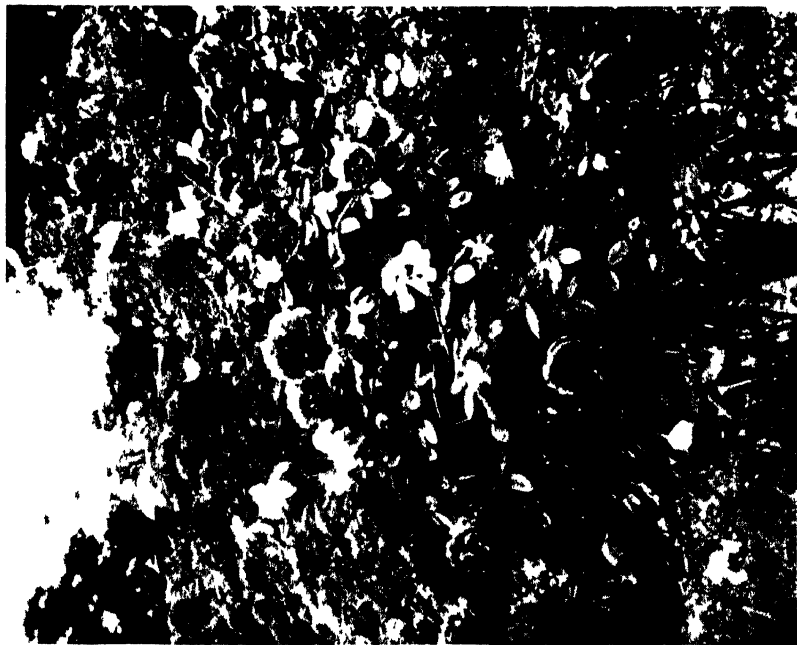


FIG. 61—*Rosa gallica versicolor* (See p. 173)





—*R. centifolia* 'Tour de Malakoff' over 6 ft high
at Chetwode Manor (See p 176)

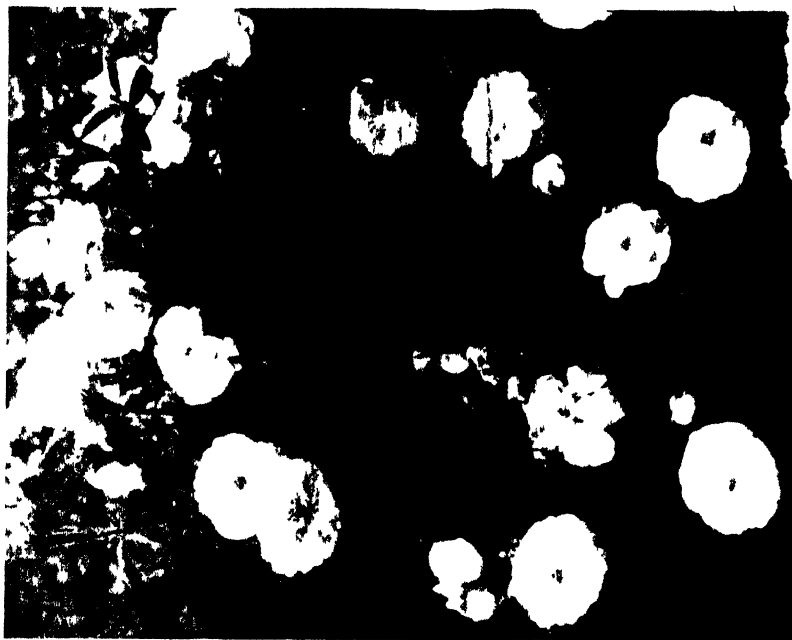


FIG. 64—*Rosa damascena* 'Mme Ha



Photo, Abbing

FIG 69—Camellia 'Salutation' A hybrid between *C. reticulata* and *C. saluenensis*



FIG. 70 *Prunus serotina* 'Tu Haku' at Barenden Kent



FIG. 71— *R. damasena rubrotincta*, or 'Hebe's Lip' [from Willmott, *Genus Rosa*, 2. 375 1912] (See p. 179)

MOTT's *The Genus Rosa*, published in parts in London between 1910 and 1914

REDOUTÉ's famous work, a tall three-volume folio containing 170 flower colour-plates, over 21 in. \times 14 in., was produced when the artist had long won his place as one of the foremost flower-painters in Europe. The Revolution had not upset his life. Before it, he had been one of the artists employed in making the *velins*, or botanical drawings, for the *Bibliothèque du Roi*, and flower-painter to MARIE ANTOINETTE. Under the Republic he was appointed one of the official artists attached to the *Jardin des Plantes* (formerly the *Jardin du Roi*), and after the triumph of NAPOLEON he became flower painter to the EMPRESS JOSEPHINE at Malmaison. She is said to have borne the whole cost of the plates, though actually she died in 1814 before they began to be published. While publication was in progress REDOUTÉ succeeded the Dutch painter, VAN SPAENDONCK, as Professor of Iconography at the *Jardin des Plantes*.

The plates of *Les Roses* are in stipple engraving, printed in colour and finished by hand, a method which REDOUTÉ had studied in England in his earlier years. The work deals partly with wild species and partly with garden varieties cultivated in France, and was not originally designed to be a work of systematic botany. But the botanist, THORY, who wrote the text for it, re-arranged it in the octavo edition of 1835 on a more scientific basis.

REDOUTÉ enjoyed unrestricted use of State and Royal gardens, and those of the chief commercial horticulturists of the day; MISS WILLMOTT was, herself, the owner of a fine garden at Warley Place in Essex, which was her home from very early days. She inherited from her mother an enthusiastic interest in gardening and botany, and devoted much of her time and ample means to the development of the Warley Garden and the cultivation in especial of herbaceous and rock-garden plants, Daffodils and Roses. She was the first woman Fellow of the Linnean Society, and a Member of the Floral, and Daffodil and Tulip Committees of the Royal Horticultural Society, and one of the three original Trustees of the R.H.S. Gardens at Wisley. She died only in 1934. In the *Genus Rosa* she set out to provide a systematic botanical record of Rose species and to this end she enlisted the collaboration of JOHN GILBERT BAKER, formerly Keeper of the Kew Herbarium, who contributed the botanical descriptions, and the Royal Academician, ALFRED PARSONS, President of the Society of Painters in Watercolour, who made the drawings for the plates. She herself wrote the general description of each Rose and an account of its source and history and similar matters, prefacing the whole by a Dedication to QUEEN ALEXANDRA which it must have given her great pleasure to write. It is in pure sixteenth-century style, and might have been addressed to GLORIANA herself. MISS WILLMOTT also bore, herself, the whole expense of the work, which forms two massive folio volumes, containing 132 colour plates over 14 in. \times 10 in.

REDOUTÉ's work is generally held to have attained perfection in its own sphere. This is not art for art's sake, still less for the relief of the artist's subconscious self. Strictly speaking, it is not art but craftsman-

ship, and craftsmanship in the service of science. But in the delicate, faithful and sensitive delineation of flower after flower it reaches a level of sustained loveliness which places it in the highest rank of botanical illustration. And the scale, of course, is important. The large page seems to isolate its subject from the world and present its beauties to our detached and peaceful contemplation. No octavo or miniature reproduction can achieve this in any sense at all, and the fact should be remembered by all who only see such plates in reduced reproduction. The illustrated pocket edition, however charming, is always a species of toy-book.

It is hard to stand comparison with REDOUTÉ's famous masterpiece. MISS WILLMOTT's is a noble book, in scope and content, as well as in format, paper, and typography. But the colour-plates (done in colour-lithography) inevitably fall far below those of her predecessor. The indefinable "life" communicated by engraver and hand-colourist is gone, and the extreme smoothness of the paper used is perhaps partly responsible for a comparatively flat effect.

Of both works the Lindley Library possesses exceptionally interesting copies. Of REDOUTÉ, it owns one which contains the plates in duplicate, the uncoloured engraving on deep buff paper facing the finished colour-plate. Such copies were for presentation to special personages and very few were made. The history of this one is not known. Of MISS WILLMOTT's monograph the Library possesses a copy containing all PARSON's original water-colours, each bound opposite its colour-plate. This is extremely interesting as showing the quality of the original drawings and one realizes on examining them how much has been lost. The clear outlines have thickened, and the vivid yet transparent colouring has lost its ethereal quality and finer gradations of tint and become heavy and uniform. This is partly owing to a definitely yellow tinge which pervades the whole of the printed colouring and deadens the brilliant hues of the original. But the reproductions still form a charming and valuable record. MISS WILLMOTT's plates have not yet been reproduced, so far as we know; but some of REDOUTÉ's have been reproduced from time to time on various scales; and most recently perhaps in DR. JOHN RAMSBOTTOM's *Book of Roses* in the King Penguins.

SOME HERBACEOUS PERENNIALS

F. G. Preston, V.M.H.

(LATE SUPERINTENDENT, UNIVERSITY BOTANIC GARDEN, CAMBRIDGE)

PART II

LATHYRUS ROTUNDIFOLIUS, a glabrous climbing everlasting Pea, 4-5 feet high, with broadly winged branches and many flowered peduncles of large, bright rose pink flowers produced from the base of most of the leaves during June and July. It is a native of Russia and the East. It is of easy culture, if given a sheltered position. Apart from growing up sticks in the herbaceous border, it is very suitable for growing on a

dry stony bank and is very effective when allowed to ramble over the ground surface. Readily increased by seed and like most of the perennial Sweet Peas, when once established, it continues for years without much attention.

Liatris pycnostachya, an interesting herbaceous perennial, 3 feet or more high, with lanceolate to narrow linear leaves and wand-like spikes of purplish flowers with petaloid colouring of the involucre bracts which adds very much to its attractiveness. It blooms during the summer and the colour of the flowers, being one not common among herbaceous plants, justifies its inclusion. It is particularly effective when grown in a mass, while it is most useful for growing on dry soils, although better results are obtained when it is given better conditions. It is readily increased by off-sets from their corm-like base, or by seed which should be sown as soon as ripe. It is a native of N. America where it has a very wide distribution.

Ligularia clivorum, sometimes known as *Senecio clivorum*. This is one of the noblest of the Groundsel family, a plant, 4 feet high, with loosely corymbose-paniculate inflorescence 6-8 inches across, at first covered, more or less, with a cobweb-like tomentum and producing in August and September many large bright orange coloured erect flower heads 3-4 inches across, the floret rays being surrounded by thick, reddish-brown linear bracts, the anthers being of the same colour. The kidney or heart-shaped, coarsely toothed base leaves 12-16 inches across on long stout petioles, stem leaves few and small, the petiole with a large inflated stem clasping sheath.

It was introduced into this country in 1900 from the mountains of Western Hupeh; it is also a native of Japan, where it grows in the mountain meadows of Hakodate, at an elevation of 2,000-7,000 feet. It is a very handsome plant and requires more moisture than most border plants and is very suitable for the waterside: if there, it should be planted so that its roots get the benefit of the moisture, but so that the crowns of the plant should not be submerged in the winter. It is readily increased by seed, seedlings usually springing up around the parent plant, or by division which should be done in the spring.

Ligularia Wilsoniana (*Senecio Wilsonianus*). Another giant Groundsel 4-5 feet high from China with elongated columnar spikes of bright yellow flowers and sharpened toothed kidney-heart shaped leaves, requiring the same cultural treatment as the previous species.

Lysimachia Ephemerum. The Willow-leaved Loosestrife, a plant 2½-3 feet high with long, terminal erect racemes of many white flowers, often slightly tinged purple, the individual flowers being about ½ inch across. The ovate corolla lobes are twice as long as the calyx, the stamens being slightly exserted. The leaves are opposite and glaucous. A native of Spain and S. France. It is readily increased by seed or by division. It has been known as *Lysimachia salicifolia* and *Ephemerum Matthioli*.

Macleaya cordata (Plume Poppy). From 5-8 feet high with terminal panicles of pinkish flowers, raised high above the large glaucous, heart-shaped, much lobed, deeply-veined leaves this plant gives a very bold and striking effect for quite a long distance. It is ideal for the back of

borders, in shrubberies, or in the wild garden. Although closely allied to our common Poppies, the flowers look very different, being small and petalless, the deciduous pink sepals being petal-like.

It is an easy plant to grow in any good soil and readily increased by suckers, which are freely produced and soon make strong plants. Sometimes known as *Bocconia cordata*, it is quite an old garden plant, having been introduced from China in 1795.

Mertensia virginica (Virginian Cowslip). This North American Bluebell is one of the daintiest of herbaceous perennials, with its beautiful metallic foliage of bronze, blue, grey and violet in early spring which is followed in April and May by its many drooping clustered sprays, 18-24 inches high, of trumpet-shaped flowers, in shades of blue, pink, lavender and turquoise. The individual flowers are about 1 inch long with a purple tube, the lobes of the corolla being somewhat pronounced. The glabrous, conspicuously veined leaves are obovate or oblong, the lower ones long stalked, the upper ones sessile. It is an easily grown plant if given a rich loamy well-drained soil and a sheltered position to prevent the late spring frost from damaging the foliage, and when once established should remain undisturbed. It is equally suitable for woodland planting as for the border. It is readily raised from seed which should be sown as soon as ripe, increase by division being somewhat uncertain. It is also known as *Mertensia pulmonarioides*.

Morina longifolia, an interesting member of the Teasel family, which to all outward appearance is somewhat Thistle-like when out of flower. The large, showy, labiate-like flowers, which are produced from June to August are white in the bud stage, turning pink, finally crimson, and are borne in crowded dense whorls, intermixed with leaf-like bracts and spiny bracteoles, forming a dense spike 3 feet or more high above a mass of hairy thistle-like foliage, the spinous toothed leaves being about 6 inches long and 1 inch wide.

A native of the Himalayas at an elevation of 9,000 to 10,000 feet, it is quite hardy. It can be increased readily from seed and succeeds in a deep light soil. This is an attractive and interesting plant aptly described by the late REGINALD FARRER "Morinas suggests a strangely handsome dead nettle, that has married a thistle."

Ostrowskia magnifica (The Giant Bellflower). This monotypic genus of Campanulaceae has terminal corymbiform racemes of from three to six erect bell-shaped, pale lilac, flowers, which are as much as 4 inches across, borne on 4-5 feet red speckled stems which are as thick as a lead pencil, with whorls of 4-5 ovate, toothed, short stalked leaves. It is indeed a very noble plant when flowering in June, and quite the most handsome of the whole "Bell" family. It is propagated by seed, which should be sown as soon as mature, otherwise it takes a long time to germinate. It should be grown on the first year or so in a cold frame in pots, when it should be planted where it is intended to grow. It requires a well-drained position in light, rich, sandy soil of considerable depth, to allow the thick fleshy tuberous roots to go down deep and a sheltered place, taking care to stake the growths as they develop. It can also be increased by cuttings, both top and root in the spring;

increase by division is not very successful, as the plant generally resents disturbance.

It is a native of Central China, being first discovered in Eastern Bokhara. The young growths are subject to damage from late spring frosts, so that it is advisable to protect with some pine-needles or bracken, while a handlight in the autumn to protect from excessive moisture prevents premature growth. It is not an easy plant to grow, but fully justifies any trouble taken.

Paeonia Cambessedesii, producing in April and early May solitary, erect, deep rosy pink flowers, $3\frac{1}{2}$ inches across with yellow stamens, the flowers harmonizing with the divided, coriaceous leaves which are deep green above and purple below with nerves conspicuous on both sides, for its red petioles and stem it is equal to any of the herbaceous kinds as a garden plant. A native of the Balearic Islands and Corsica where it was found growing in a rocky, almost inaccessible spot on Cape Formentor, in the island of Majorca. It enjoys a rich deep soil and fair amount of moisture, and like most herbaceous Paeonias, will grow almost as well under the shade of trees as in the open border exposed to the sun, and therefore it is very suitable for grouping with hardy ferns.

Paeonia emodi. This beautiful Paeony from the Himalayas, which produces in May pure white flowers with conspicuous golden yellow stamens, somewhat resembles the well-known *Paeonia lactiflora* (*P. albiflora*), differing chiefly by its solitary tomentose carpel. *P. emodi* also differs in its deep green leaves, as the leaves of *P. lactiflora*, however white the flowers, appear invariably reddish although old leaves of *P. emodi* may become bronzy or even red, but it is quite distinct from the colouring found with *P. lactiflora*.

P. emodi is more tender than any other herbaceous species, commencing growth earlier than most and thus subject to spring frost, it should therefore be given a sheltered, well-drained position with a west aspect, to avoid the sun till late in the day as Paeonias, like many other plants, suffer more from sudden thaw than from the actual frost. Propagation is by division of the root stock when possible, which is best done in early autumn, or by seed which should be sown as soon as ripe, but this is rather a slow method, as it usually takes two years for Paeonia seed to germinate and then 2 or 3 years before it will flower.

Pericome caudata, a strong scented much branched composite, 4 feet high forming a conspicuous dome, furnished during the late summer and autumn with numerous heads of golden yellow flowers in terminal corymb-form cymes, the flowers being conspicuously longer than the involucre. The leaves opposite, triangular-hastate, the apex and some of the basal lobes, long, caudate-acuminate. It is a perfectly hardy and useful plant for growing in dry or exposed positions. A native of Western North America, it grows on the mountains from Colorado to New Mexico and Arizona. Propagation by division or by cuttings of young growth in the spring.

Phytolacca clavigera. A plant 4-5 feet high, with semi-succulent purple tinted stems, which terminate in compact racemes 6-8 inches long, of flowers with beautiful purple rose-coloured perianths,

contrasting strongly with the bright green, conspicuous ovary. Smaller racemes come from the sides of the main stem, all of which are followed by densely crowded, cylindrical spikes of deep black juicy eight-carpelled berries, which remain very conspicuous after the large leaves have fallen, and the stems by then have taken on a much deeper purple colouring. It is perfectly hardy and readily increased by seed or by division of the fleshy root stock.

A native of Western China it was collected in Yunnan just over thirty years ago by the late GEORGE FORREST.

Platycodon grandiflorum (Balloon Flower). An attractive member of the Campanulaceae, probably a monotypic genus, differing from *Campanula* by the shape of the flower and the way the capsule splits for seed dispersal. It forms a dense erect clump 1½–2 feet high, branching from the base, each shoot furnished with lanceolate, glabrous leaves, terminating in June and July with a solitary or few large open blue flowers 3 inches in diameter, which are inflated in the bud stage, from which it derives the name of Balloon Flower. It requires a light sandy loam and will not succeed in stiff or badly drained soil. The stems are very brittle and should be supported; the old stems should always be allowed to die away naturally, rather than cut away. It can be readily increased from seed, also by division, which should be very carefully carried out, owing to its fleshy root stock, the spring being the best time, when the plant is breaking into growth and only for this purpose the plant be disturbed. It is a native of China and Japan. There are several varieties, white, various shades of blue, as well as a semi-double form, all of which are good border plants.

Polygonum campanulatum. One hesitates to introduce *Polygonums* into a herbaceous border, owing to their aggressive rambling, but *Polygonum campanulatum*, one of the most attractive of the Knotworts, is certainly worth a place in any border. Although discovered as far back as 1848 by SIR JOSEPH HOOKER in Eastern Nepal, twenty years after by C. B. CLARKE on the eastern frontier of Sikkim and later in 1906 by GEORGE FORREST in the Lichiang range in North-western Yunnan, it was first introduced into this country from Calcutta in 1908–9, flowering for the first time in 1910.

A very beautiful plant, forming a dense clump during the summer 2–3 feet high, terminating with crowded clusters of bell-shaped flowers, varying from pure white, through all the shades of rose to carmine, which are augmented by secondary long-stalked panicles from the proceeding dark green ovate and lanceolate leaves, giving a succession of flower until late in the autumn. It succeeds in almost any soil, preferably damp, and appreciates a little shade, being subject to scorching in excessive sunshine, particularly a hot dry summer. The plant lends itself readily to division, but the stolons are mostly very short, so that there is no danger of it becoming a nuisance as is the case with a number of the genus.

Rudbeckias. Few herbaceous borders would be complete without some representatives of the Cone flower, of which there are several with striking habit, distinct foliage and conspicuous cone-like receptacles, all native of North America and excellent for the back of the border; they

are of easy cultivation in almost any position, providing it is a fairly open one.

Rudbeckia laciniata. A North American plant, now naturalized in Europe, 5-7 feet high with bright yellow flowers, with lower leaves 3-5 parted, upper ones 3 parted, top ones simple. There is a double flowered form known as 'Golden Glow' probably the only known full double *Rudbeckia*, while the variety 'Herbstonne' (Autumn Sun), sometimes erroneously spelt 'Herbstone' is the most striking autumnal plant in the garden when it is in bloom, with its large bright yellow drooping rays. It is a taller plant, with less divided leaves than the type. They are all increased readily by division, and are excellent for cut flowers.

Rudbeckia maxima, 4-6 feet high with pale yellow, solitary flowers, having long drooping rays, elongated columnar disk, on long peduncles and large oval or oblong, entire glaucous leaves, up to 1 foot long, the lower ones petiolate, the upper ones clasping.

A handsome plant, but not so happy as some species on dry calcareous soil.

Rudbeckia speciosa. A plant 2-3 feet with freely branching stems, it is suitable for the front of the border or for a bed, where the orange coloured ray florets contrast well with the black purple disk. This plant requires more moisture than some species. Increased by seed and division. Sometimes known as *R. Newmanii*.

Salvia dichroa, one of the most handsome of the whole genus with its long beautiful racemes, a foot or more in length, bearing many blue and white flowers in July and August. These are $1\frac{1}{4}$ inches long, the upper lip of bright blue, as long as the lower lip, which consists of 3 lateral lobes, two of which are paler, the centre one white and pendulous. These attractive inflorescences rise 3-4 feet above irregular, sinuate-serrate leaves. It is a native of the Atlas mountains, at an elevation of 2,000 ft. It is not perfectly hardy in heavy soil, but it is readily raised from seeds which are best sown as soon as ripe (Fig. 67).

Salvia \times *superba*. This is one of the most conspicuous of herbaceous plants, flowering from June to October and few make such an attractive display. The stiff, erect, fastigate shoots 2-3 feet high are furnished with greyish-green leaves along half their length and terminate in slender spikes of small violet-purple flowers and red-purple bracts. For many years this plant has been known in gardens as *S. nemorosa*, *S. nemorosa* var. *virgata*, *S. virgata* var. *nemorosa* and *S. silvestris* var. *superba*. But investigation by the late DR. STAPF led him to the conclusion that it was a natural hybrid, probably between *S. silvestris* and *S. villicaulis*, both of which grow in the Balkans, see *Botanical Magazine* t. 9169. It is readily propagated by division or by cuttings of young growth in spring.

Salvia uliginosa. This is one of the most attractive of late flowering plants, with its spiciform racemes of azure blue and white flowers; the calyx, sometimes being coloured, adds to its attractiveness. It is a plant 5-6 feet high with greyish-green leaves 3-4 inches long and is in bloom from September to November. It is a native of eastern South America and has been collected in Brazil, Uruguay and Argentine where

it grows in the marsh lands and along riverside banks. It may not be perfectly hardy so that it is advisable in wet heavy soil to protect the roots during the winter, and as it is readily rooted from cuttings a few inserted in pots and kept in a cool frame form a good safeguard (Fig. 68).

Sanguisorba obtusa var. *amoena*, sometimes known as *Sanguisorba obtusata* and *Poterium obtusatum*. An attractive herbaceous perennial from Japan, 3-4 feet high, producing throughout the summer much branched stems bearing spikes 3 inches long of rosy-purple sessile flowers, with conspicuous rose-coloured anthers, which are 3 or 4 times as long as the calyx, giving the inflorescence a light feathery appearance. The long pinnate leaves have about 6 pairs of oblong serrate leaflets.

Readily increased by division of the root stocks it prefers a good, well-drained soil.

Sidalcea candida, a hardy perennial about 3 feet high from the Rocky Mountains, closely allied to the Hollyhock, bearing during the late summer erect, terminal, spike-like racemes of short-pedicellate or sessile white silky flowers, each of which are 1 inch or more across. A good border plant of easy cultivation in good loamy soil. Propagated by division and by seed.

Silphium laciniatum, commonly known as the 'Compass Plant of the Prairies.' This is a noble and interesting plant growing as much as 6-8 feet high, and bearing in August and September a profusion of sessile or short peduncled rather large sunflower-like, bright yellow flowers and much divided foliage. The stem leaves always maintain a vertical position, having a tendency to point North and South or tend to assume a position in which the two faces are about equally illuminated by the sun. A native of various parts of North America, it succeeds in any good, well-drained soil and is propagated by division and by seed.

Smilacina racemosa, not by any means a new plant, but certainly one that should find a place in the shaded or partly shaded portion of the herbaceous border or semi-woodland. Its slender stems from 1-3 feet high with oblong lanceolate or oval leaves, terminate with panicles of numerous white flowers. It is a handsome plant both in flower and foliage and is of easy cultivation in good soil and preferably in a partly shaded position. Increased by division of the rhizome or by seed. It can be grown as a pot plant and may be forced slowly. It is a native of North America and is sometimes known as *Vagnera racemosa*.

Solidaster luteus. A bigeneric hybrid of special interest with erect stems 2-2½ feet high, and much branched inflorescences forming in the later summer and autumn corymbiform panicles of many small flowers which are canary yellow, fading to creamy yellow. It is decorative as a cut flower and a charming border plant, requiring the same treatment as the Michaelmas Daisy. The history of this plant to many, has been a mystery. It has been known as *Aster lutea*, *Asterdago luteus*, and a *Solidago*. See *Gardener's Chronicle*, S. III, 1937, Vol. 91, p. 6. Apparently it was one of a batch of seedlings raised in France, from *Aster ptarmicoides* several showing signs of possible hybridity, probably being crossed with *Solidago missouriensis*. These were selected, but all but

one was lost during the 1914-18 war, the one saved being the plant now grown *Solidaster luteus*.

Steironema ciliatum. This North American Loosestrife has sparingly branched stems 1-3 feet high, providing during the summer in the axils of the uppermost leaves pale yellow saucer-shaped flowers on very slender peduncles, both solitary and borne in clusters, with coarsely ciliate leaves 3-6 inches long all on long fringed petioles in whorls on the flowering shoots. An attractive dainty border plant requiring a damp soil. Readily increased by seed and by division. It is closely allied to *Lysimachia* and sometimes included in that genus, but differs in the presence of staminodes alternating with the fertile stamens.

Stokesia laevis. A very handsome Composite from North America, one of the choicest of herbaceous perennials; to all outward appearance in size and beauty of flower resembling the well-known annual China Aster. Its large flowers 3-4 inches across which open first in August will often continue till the frost comes. An erect branching plant 1½-2 feet high with purplish branches of lanceolate leaves, the main ones entire and tapering into a broad flattened stalk, the stem leaves, which have a few teeth each side, terminating with many large purplish-blue flowers of which the marginal florets are larger and subradiate. It is also known as *Stokesia cyanea*.

It requires a sunny position in well-drained soil, but is not successful in cold heavy clay. It is excellent as a cut flower, remaining fresh for a long time. Readily increased from seed, or by division. The var. *alba* has white flowers and the var. *praecox* is a lavender-coloured form.

Thalictrum Delavayi. An attractive Meadow Rue 3 foot high, with lax panicles of pendulous flowers with pale lilac or bluish purple sepals ½ inch long and a profusion of bright yellow stamens of the same length which are very effective above the slender, branching fern-like bluish and bronzed foliage. It blooms on into the summer and should have a position both sheltered and sunny. A native of the mountains of East China at an elevation of 4,000-6,000 feet.

Thalictrum dipterocarpum. A native of Yunnan, one of the most decorative and desirable of plants, with long graceful stems, branching towards the top in long loose sprays of flowers, the rose-lilac sepals contrasting perfectly with the creamy yellow colouring of the stamens. The broadly triangular-shaped foliage consisting of many small subrotund, cordate leaflets, pale green above, glaucous beneath. The smaller stem leaves add to its grace and beauty. It is a charming plant for the border and excellent for cutting. There is a white-flowered variety as well as a form with double flowers.

Thalictrum diffusiflorum from South-East Tibet somewhat similar to the previous species, equally as tall and considered by some to be a superior plant, with large mauve flowers and even frailer and finer foliage.

All these *Thalictrums* require a light, loose, well-drained soil in a sunny position. They are readily raised from seed.

Thermopsis montana. A North American Legume with long, erect, lupin-like racemes of large bright yellow flowers during May and June.

It spreads freely by means of its deep-rooted, underground rhizomes, by which means it can be propagated although by this method it takes some time to become established, the best method is by seed, which is best shown as soon as ripe. It is not particular to soil, but prefers one that is deep and well drained.

Thladiantha Olivieri. Although an herbaceous perennial, it is hardly a plant for the herbaceous border. This interesting member of the Cucurbitaceae, however, is an excellent plant for growing up trellis work or to conceal unsightly objects. It has softly pubescent, branching herbaceous stems, rising from a thick fleshy root stock and is furnished with large heart, shaped leaves, growing as much as 30 feet in the summer, producing during June, July and August, clusters of large golden yellow, bell-shaped flowers. The plant is dioecious, the staminate plant being very attractive and making a good show each year at the Botanic Garden, Cambridge, where it appears to be perfectly hardy. The pistillate plant must be very rare in cultivation, for years I have tried to obtain it, but have not been successful.

A native of Central China, it will succeed in any well-drained soil and is readily propagated by young shoots as well as by root cuttings.

HYBRID YELLOW TREE PAEONIES

John C. Wister

THE October 1947 JOURNAL contains a note by COLONEL STERN on a recently discovered wild form of *Paeonia lutea* of Tibet. This prompts me to send in a few notes about the hybrids of *P. lutea* and of *P. Delavayi*, crossed with *P. Moutan (suffruticosa)* which have been produced in the United States during the last twenty years and which are not yet widely distributed or much known abroad.

P. lutea was discovered by the French Jesuit priest, JEAN MARIE DELAVAY in southern China in 1883, and introduced to the Paris Museum of Natural History in 1886. Flowers of it were exhibited in Paris by PROFESSOR MAXIME CORNU in 1892. This great horticulturist was reported to have remarked at the time that the new species was of no importance because it was so small. How astonished he would be to see the hybrids between it and *P. Moutan (suffruticosa)*. The first cross between the two species was made by PROFESSOR LOUIS HENRY of the Paris Museum. He was followed by VICTOR and EMIL LEMOINE of Nancy.

The success of these two breeders encouraged A. P. SAUNDERS, Professor of Chemistry at Hamilton College, Clinton, N.Y., and Secretary of the American Paeony Society, to make crosses. As a result of his work during the last thirty years there have been named about forty varieties which give promise of great garden value. The first of these is 'Argosy,' which was introduced into commerce in 1928 and received an F.C.C. from the Massachusetts Horticultural Society. It is a clear sulphur-yellow with a plum-coloured blotch at the base of the petals and the

flowers are about the same size as LEMOINE's variety 'L'Esperance.' It is a good strong grower and has been taken up by several nurserymen in this country so it should become fairly widely known before many years.

Most of the other SAUNDERS' varieties were introduced much later. They have a great colour range. The palest, 'Silver Sails,' was introduced in 1940 and is very pale or silver-yellow with a flush of pink towards the edges.

'Narcissus,' introduced in 1941, is also a clear yellow, somewhat deeper towards the centre, but without any flecks of reddish or purplish colour which most of the varieties have. 'Canary' is a little brighter than 'Argosy,' and 'Roman Gold,' a brilliant yellow, is the deepest yellow to date.

At the other end of the colour spectrum there are 'Black Pirate,' introduced in 1935, and 'Corsair,' introduced in 1941 and which blooms a week earlier. These are maroon, or dark mahogany red with dark stains at the base and are about the darkest of all Tree Paeonies. They get their deep colour from *P. Delavayi*, which DELAVAY discovered a year after he found *P. lutea* but which did not come into commerce so quickly. The botanists, FINET and GAGNEPAIN considered *P. lutea* merely a botanical variety of the species *Delavayi* but FRANCHET considered it a distinct species.

A number of PROFESSOR SAUNDERS' varieties give a range of colours between these two wild types. Among these are 'Banquet,' 'Brocade,' 'Centaur,' 'Damask,' 'Harvest' and 'Princess.' These have pink and magenta tones which are fascinating to some gardeners and anathema to others.

Just which varieties will eventually take an important place in commerce remains to be seen. The propagation of these hybrids is much more difficult than that of the ordinary *Moutan* varieties. One American nurseryman, W. B. CLARKE of San Jose, California, is now cleft grafting them on potted understocks of *P. Delavayi* with considerable success. How well the grafts on this stock will do in cold climates remains to be seen as neither the wild form of *P. Delavayi* nor the wild form of *P. lutea* are very vigorous growers in the climate of our middle states and tend to die out in time rather than make big plants. Experiments are under way to determine possible methods to propagate these new varieties from soft wood cuttings made in May or June under a continuous mist spray.

All the hybrids of this group bloom a week or two later than the *Moutan* varieties and in the climate of eastern Pennsylvania usually come the last week in May, sometimes continuing to early June. How big the plants will grow is not known as there are no old specimens to be seen. Ten-year-old plants of 'Argosy' growing on the grounds of Swarthmore College are about 2½ feet high by 3 feet or more across. Older plants of the French varieties, like 'Souvenir de Maxime Cornu,' 'Surprise,' 'Flambeau' and so forth have grown bigger than this with us.

With the exception of 'L'Esperance' and 'Mme. Louis Henry,' most of the French varieties are heavy double flowers with stems not strong enough to support them properly so that the flowers hang under the foliage. Most of PROFESSOR SAUNDERS' seedlings, on the other hand, are

singles and hold the flower up well. He has also several very beautiful doubles, among which 'Festival' is perhaps the finest. Its flowers are not so heavy as the French varieties and are held up better. One of the interesting features of the new wild form of *P. lutea* from Tibet is that the flowers are larger and held on much stronger stems, so it is to be hoped that when hybrids of this appear they may overcome some of the weaknesses of the hybrids from the Chinese form. Meantime the New American hybrids mentioned in this article deserve a wide trial, and it is to be hoped that when conditions become more normal they will be grown in many gardens in Great Britain.

NOTES FROM FELLOWS

Fifty-five years as a Horticultural Journalist

THE RECORD OF MR. CHARLES H. CURTIS, F.L.S., V.M.H.

MR. CURTIS, in his speech at the Annual General Meeting, mentioned that he thought he held the record for official services in connection with the Royal Horticultural Society. After the meeting, at my request, he gave me some more details of this record and he has been kind enough to amplify them. It is a wonderful and probably unparalleled record, and I would like to pay to MR. CURTIS the tribute of making its inspiration available for the Fellows of the Society.

MR. CURTIS started gardening at fourteen, working first in a nursery and then in two private gardens at Wimbledon. Then he spent two years at VEITCH'S Chelsea Nursery. VEITCH was responsible for the introduction and cultivation of many new and valuable plants during this period and to work there must have been an experience of most unusual interest. This was followed by two years at Kew, after which MR. CURTIS moved to Chiswick, near where he still lives, and entered horticultural journalism.

He remained with *The Gardeners' Magazine* for twenty-five years and since then has been with *The Gardeners' Chronicle*, of which he is now Editor, for thirty years. This makes fifty-five years in horticultural journalism.

MR. CURTIS was also Hon. Secretary of our Narcissus and Tulip Committee for twenty-one years, Secretary of the National Sweet Pea Society for twelve years, Secretary of the National Chrysanthemum Society for thirteen years, Secretary of the British Florists Federation for several years and Chairman of the United Horticultural Benevolent and Provident Society for forty-eight years. He is also a Vice-Chairman of our Orchid Committee, of which he has been a member continuously for more than forty years. During this time he also engaged in local government work for about twenty-one years and was the second Mayor of the Borough of Brentford and Chiswick, Chairman of Gunnersbury Park Joint Committee on two occasions, Chairman of Brentford Allotments and Gardens Society for twenty-five years, of which he is now President. MR. CURTIS has also written several useful horticultural books.

In 1917 the Royal Horticultural Society decided to take a prominent part in the scheme for increased food production and to work in conjunction with the Food Production Committee—of which DR. (now SIR) FREDERICK KEEBLE was head. In addition to single lectures and local demonstrations during evenings or Saturdays, it was decided that an exhibit should be arranged for display at various centres throughout the Midlands and the South, wherever the local authorities were able and willing to hold a Food Production Exhibition extending from one to three weeks. MR. CURTIS was invited to "build up" a suitable exhibit and to go with it as lecturer and demonstrator. The scheme proved a great success and was always one of the most popular items at these centres. He gave series of lectures on Food Production at numerous places and in the suburbs of London. He was assisted by the late MR. W. H. DIVERS and with his help carried on with all exhibitions definitely arranged up to the end of 1918. The R.H.S. exhibit weighed about three-quarters of a ton, so packing, unpacking and staging were not light tasks. LORD GRENFELL was President; he visited the exhibition at Bournemouth and as a result the Council sent MR. CURTIS a "very charming" letter of thanks and congratulations. REV. W. WILKS was Secretary at that time. For his services to horticulture on the Continent MR. CURTIS has received honours from the Governments of France and Belgium.

ABERCONWAY

Kolkwitzia amabilis

I saw *Kolkwitzia amabilis* Graebn., the Beauty Bush, for the first time last spring in several gardens in Pennsylvania, and have rarely seen any shrub produce so much bloom. BAILEY gives it but brief mention in *Hortus*, calling it "a showy Chinese deciduous shrub to 8 feet," and REHDER calls it merely "graceful" and "very handsome in spring."

It certainly is very handsome, and since W. J. BEAN describes it as hardy in this country, doing particularly well in Sussex, I wonder why it is not better known here as well as on the other side of the Atlantic. If it can stand the intense cold of the winter on the Eastern Seaboard of the United States and the prolonged drought of the summer, and it seems quite happy in both these extremes, it seems strange that it is not in every English garden, where these conditions do not have to be tolerated.

Late spring frosts in many districts of this country would be likely to damage the young growth, but where protection can be given or shelter provided I see no reason why it should not be grown.

The edition of SANDERS' *Encyclopædia* which I use, does not even mention it, and I am left wondering why anything so beautiful could have escaped the notice of nurserymen for so long.

It was apparently introduced into the United States, from China, in 1901, being named after a German botanist.

Kolkwitzia amabilis is the only species known and has opposite leaves, ovate and about 3 inches long. The flowers are pink with a yellow throat, bell-shaped, about $\frac{1}{2}$ inch long and borne in axillary pairs, forming corymbs often 3 inches across. I have counted as many

as fifty flowers in one corymb, these being placed at the ends of the shoots. There was not one single shoot on the bush which had not got its terminal cluster of flowers. It began flowering in Philadelphia during the latter half of May, and went on through June and well on into July. It propagates easily from half ripe cuttings in summer.

ELIZABETH HESS, N.D.H.

Magenta and Blue in Rhodesia

I was very interested in the article "Two Colours" by P. H. Davis in the December number of our R.H.S. JOURNAL. It is a change, I should say a very pleasant change to find someone standing up for that much maligned colour "magenta," and I would like to add my testimony as to its extraordinary beauty in conjunction with blue. A border had been prepared for Gladioli some months before planting time; in the interim this border became self sown with *Lychnis coronaria* and *Cynoglossum amabile*. So great was the beauty of the magenta *Lychnis* with its silver fatted leaves and turquoise-blue of the *Cynoglossum* that we had neither the heart nor the wish to remove them, so the Gladioli were relegated to another part of the garden. The setting of this magenta and blue border was particularly pleasant, massive lichen-covered granite rocks, at the foot of which flowered in great profusion the palest lemon-coloured *Dimorphotheca*.

All this fortuitous beauty came to us in October. In a year of normal rainfall there would have been a pool—fed by a spring near the base of the granite rocks, but having just come through the worst drought the country has ever recorded, the spring was dry.

S. Rhodesia

J. DICKINSON

PLANTS TO WHICH AWARDS HAVE BEEN MADE IN 1948

Camellia 'Cornish Snow' A.M. February 17, 1948. A very distinct hybrid raised at Caerhays by the late Mr. J. C. Williams from a cross between *Camellia saluenensis* and *C. cuspidata*. It is a freely-branching, evergreen shrub with narrow-ovate, finely serrate, dark green leaves and flowers produced singly or two together in the leaf-axils. The white corolla is composed of about eight rounded petals and contains a cluster of yellow stamens. Exhibited by C. Williams, Esq., M.P., Caerhays Castle, Gorran R.S.O., Cornwall. (See p. 1.)

Camellia japonica alba grandiflora A.M. February 17, 1948. A very handsome variety with double, pure white flowers nearly 5 inches across, centred with small petals and golden-tipped stamens. Exhibited by C. Armytage Moore, Esq., Winterfold House, Cranleigh. (See p. 1.)

Camellia reticulata var. superba A.M. February 17, 1948. A fine seedling from one of the plants raised from seed collected by

Forrest. It is remarkable for the eight to ten, wide-spreading, vivid carmine (H.C.C. 21/1) petals, shaded on the outside with Turkey-red. The diameter of the open flower is 4 inches. Exhibited by C. Williams, Esq., M.P., Caerhays Castle, Gorran R.S.O., Cornwall. (See p. 1.)

Chimonanthus praecox var. luteus A.M. February 17, 1948. An unusual and attractive variety of the Winter Sweet. It differs from the common form in the absence of any red colouring from the flowers, which when fully expanded are widely cup-shaped, over 1 inch across, and of a peculiar pale, translucent Canary-yellow colour. Their scent is strong and pleasant. Exhibited by Messrs. R. C. Notcutt, Ltd., Woodbridge, Suffolk. (See p. 1.)

Prunus cerasifera var. Lindsayae A.M. February 17, 1948. A very pretty variety of the Cherry Plum collected by Miss Nancy Lindsay in Persia in 1937. It is a graceful small tree with blackish twigs bearing flat, pale pink flowers, $\frac{3}{4}$ -inch across, singly or in pairs at the nodes. The colour matches Rhodamine Pink (H.C.C. 527/2). Exhibited by the Director, Royal Botanic Gardens, Kew. (See p. 1.)

Rhododendron 'Androcles' (R. calophytum × R. arboreum) A.M. February 17, 1948. A very handsome hybrid with large trusses of pink flowers (H.C.C. Rhodamine Pink 527/3). Leaves 6 to 8 inches long, dull dark green above, with lighter veins; light green below, slightly glaucous. Truss large dome-shaped, containing up to 30 funnel-shaped, pale pink blossoms, $1\frac{1}{2}$ inches long and $2\frac{1}{2}$ inches wide, with four lines of darker spots from the base of the lobes to the ovary. Calyx cream, very small, petioles $\frac{3}{4}$ inch long. Bracts cream, turning brown as the flowers open. Exhibited by E. de Rothschild, Esq., Exbury House, Southampton. (See p. li.)

Rhododendron 'Choremia' (R. haematodes × R. arboreum) F.C.C. February 17, 1948. A crimson-scarlet hybrid raised by the exhibitor, which received the A.M. in 1933. It is fully described in vol. LIX (1934), p. xxxv. Exhibited by Lord Aberconway, C.B.E., House, Southampton. (See p. li.)

BOOK NOTES

"Commonsense Rock Gardening." By F. Kingdon-Ward. 174 pp. Illus. (Jonathan Cape, 1948.) 10s. 6d.

We are so accustomed to books on the grand scale from the pen of Mr. Kingdon-Ward that the book under review comes as something of an anticlimax and many of his admirers will regret that he has come down from the heights. It is doubtful whether the beginner, for whom the book is ostensibly written, will find it of much practical help in the construction of a rock garden even of the outcrop variety. How many beginners—or advanced gardeners for that matter—will know whether he is buying Tertiary or Palaeozoic sandstone, Oolite or Lias limestone? Failing suitable stone we are advised to use bricks, builders' rubble, concrete steps, old tombstones or paving setts. Whatever the material, most of it is to be pushed underground only to become visible as a very occasional outcrop.

There are many errors in the spelling of plant names, some recurring more than once, as, for instance, *Arenaria balaerica*, *Diarama* and *Ranunculus Lyalii*. Despite this and other defects the book is full of interest when the author returns to his familiar medium and writes of his experiences in Tibet, Assam and Burma. In addition it sparkles with many witty aphorisms and the illustrations are magnificent. The omission of an index is regrettable.

GWENDOLYN ANLEY

"Timber, its Structure and Properties." By H. E. Desch. Second Edition. Macmillan & Co. Ltd., London., 1947. xxii + 299 pp.; 55 pls.; 45 figs. Price 18s. net.

The strategic importance of timber during the war and the continuing need to utilize our limited supplies with the utmost economy has stimulated interest in wood technology. In recent years innumerable papers and reports have been written on the properties and treatment of timber. For various reasons many of these are not readily available to all whom they may concern and it is useful to have their more important conclusions collated in book form.

In the book under review the author has endeavoured to cater for architects, surveyors and building contractors who are interested in practical problems of timber utilization but are not in a position to study the original sources of information at first hand. The microscopic structure of softwoods and hardwoods is dealt with in some detail. This is followed by a practical discussion of the gross features of wood, explaining how sapwood and heartwood, growth rings, grain, texture, etc., influence the properties and uses of timber, and a chapter on the identification of timbers by their anatomical or structural features.

The basic physical properties of wood are considered under the headings of density, strength properties, moisture relations, heat and electrical conductivity, acoustic properties and energy value as fuel. In the final section, considerations affecting the utilization of wood are covered by chapters on seasoning defects, preservation, commercial grading and wood as an engineering material.

It should be noted that the book is essentially a treatise on the properties of timber in general. It is not intended as a source of information on specific timbers, which are only referred to incidentally as examples.

B. J. RENDLE

"Garden Plans and Designs." By George H. Hall. 227 pp. Illus. (W. H. & L. Collingridge, Ltd.) 10s. 6d.

This little book is just what is being looked for by innumerable owners of small gardens who aspire to being their own landscape gardeners.

It may be specially useful to persons responsible for laying out the gardens of new building estates in search of new ideas.

To prove the possibility of giving every garden individual character Mr. Hall has produced a hundred more or less original plans showing how variously garden plots of different shapes and sizes may be developed.

In a commendably unpretentious foreword the author summarises his sound views on the principles of planning with practical hints on construction details. He may overrate the patience of most small owners when he suggests, if necessary, spreading construction work over a period of from three to five years. One might also question whether either garden art or domestic harmony would always be benefited by roping in entire family opinion into the "fun" of planning a garden. But apart from captious criticism MR HALL's book is well worth half a guinea.

EDWARD WHITE

"Primulas for Garden and Greenhouse." By E. H. M. Cox and G. C. Taylor. 86 pp. Illus. (Dulau, Oxford, c/o B. H. Blackwell, Ltd.) 7s. 6d.

This little book is a reprint of a valuable work which was first published in 1928. It contains a number of descriptions of species in each section of *Primula* together with chapters on *Primulas* under glass and on general cultivation and propagation. Unfortunately it does not appear to have been brought up to date so that such desirable species as *Primula Clarkei* are still not included. The plates also appear to have lost their former sharpness and definition in this reprint.

"The A.B.C. of Flower Growing." By W. E. Shewell-Cooper. 248 pages. Illus. Price 4/6. Published by Hodder & Stoughton Ltd., for The English Universities Press, Ltd., London.

Generally speaking, the information given in this book is sound; it is therefore unfortunate that much which is unsound has crept in, an example being the advice, on p. 114, to bury coal ashes when Lilies are to be planted. It is both unnecessary and indeed impossible in a well-managed herbaceous border to hoe weekly during summer months, as advised on p. 46.

Most of the line drawings of flowers are good, but the one on p. 16, dealing with digging and the double-sided herbaceous border on p. 191, bear little relation to the subjects they set out to portray. One cannot but feel that either the book was prepared in a hurry or care was lacking in proof correction as an unduly large number of plant names are spelled incorrectly.

J. WILSON

JOURNAL OF THE ROYAL HORTICULTURAL SOCIETY

Vol. LXXIII



Part 7

July 1948

THE SECRETARY'S PAGE

Programme of Meetings—During July there will be Meetings and Shows as follows:—

- { Tuesday, July 6—12 noon to 6 P.M.
- { Wednesday, July 7—10 A.M. to 5 P.M.
- { Tuesday, July 20—12 noon to 6 P.M.
- { Wednesday, July 21—10 A.M. to 5 P.M.

In connection with the Show on July 20 there will be a Summer Fruit and Vegetable Show.

Lectures—During July, the following lectures will be given, each one taking place at 3 P.M. in the Lecture Room of the Society's New Hall, Greycoat Street:—

On July 6—"Lilies for Beginners" by MR. F. J. ROSE, V.M.H.

On July 20—"Bulb and Stem Eelworm; its relation to Garden Plants" by MR. G. FOX WILSON, F.R.E.S.

Carnation Show—The British Carnation Society and the National Carnation and Picotee Society are holding a joint Show in the Old Hall on July 6 and 7, to which Fellows' tickets will admit.

Demonstrations at Wisley—The following demonstrations will be given at the Society's Gardens at Wisley during July and August, the second demonstration in each case being a repetition of that on the first day:—

Fruit Garden

Wednesday and Thursday, July 7 and 8, Summer Pruning of Fruit Trees (2-4 P.M.).

Flower Garden

Wednesday and Thursday, August 4 and 5, Vegetative Propagation of Shrubs and Herbaceous Plants (2-4 P.M.).

Subscriptions—Fellows who have friends who are thinking of joining the Society are reminded that, as half the year has passed,

anyone elected after the end of June is required to pay only half a year's subscription in respect of the remainder of the current year. It is, therefore, advantageous to join the Society in July. The Secretary will be pleased to send a form of application for Fellowship on receipt of a postcard.

Colorado Beetle—The Ministry of Agriculture and Fisheries asks that notice may be drawn to the danger of the Colorado beetle establishing itself in this country. Discoveries of the beetle in England and Wales in 1947 were far more numerous and widespread than ever before, and in view of the likelihood of further outbreaks in 1948 the need for vigilance is greater than ever, since it is of the utmost importance that any outbreaks should be dealt with by the Ministry before the pest has time to spread or multiply. The Ministry is accordingly anxious to obtain as early notification as possible of the discovery of the pest in this country.

Any yellowish beetle with black stripes running up and down the beetle, not across, or any red or reddish-yellow grub that is found feeding upon potato leaves should be regarded with suspicion. When grubs or beetles suspected of being Colorado beetles are discovered, specimens should be placed in a tin box (in which no holes should be punched) with a piece of potato leaf and the box should be sent to the Ministry of Agriculture, Plant Pathology Laboratory, 28 Milton Road, Harpenden, Herts., with a letter stating the exact place where the insects were caught and the name and address of the finder. Nothing more should be done until instructions are received from the Ministry.

National Trust Gardens Fund—The President, LORD ABERCONWAY, in his annual address this year mentioned the inception of a plan to ensure the preservation of some notable gardens. An appeal for funds has now been launched and details are included in the leaflet inserted in this JOURNAL. The President and Council hope that Fellows will make a generous response to the appeal.

WISLEY IN JULY

WITH the passing of midsummer the bulk of the floral display is provided by the many herbaceous perennials and annuals in the Gardens, while most of the flowering trees and shrubs which have provided the high lights of the spring and early summer take on a more sombre and deeper green, and commence to lay the foundations for another year, judiciously helped in several cases by the removal of the old wood immediately the flowers fade.

Round the Laboratory several of the small specimens recently planted against the walls will be producing their first flowers, particularly the orange-yellow trumpets of *Fremontia mexicana*, and the brownish-orange bells and variegated foliage of *Abutilon Milleri*; larger specimens include *A. megapotamicum* (*vexillarium*) with drooping red and yellow flowers produced over a long period, a long established climbing Rose 'Mermaid' with single cream blossoms, and *Jasminum* × *stephanense*, a hybrid of *J. officinale* and *J. Beesianum* with sweetly-scented pink flowers, freely produced on well-established plants.

The formal pools were cleaned and replanted during the spring and the Water Lilies are beginning to grow vigorously as they become established.

In the Half-Hardy House, *Sphaeralcea Fendleri*, a small slightly-tender Malvaceous perennial is producing a long succession of orange-pink blossoms, while at the lower edge of the same bed will be found the pink flowers of *Zephyranthes carinata*. On the opposite side the unusual green-flowered *Anigozanthos flavidus* is carrying its 5 feet high flower stems, *Astragalus Durhamii* is covered with heads of yellow pea-like blossom, and the once widely grown scarlet *Bouvardia triphylla* is in full flower.

The Temperate House contains many Pelargoniums, Fuchsias, and Diplacis in pots on the side staging, while on the centre bed *Eupatorium micranthum* and several Cestrum are in full flower; other plants of interest include the yellow-flowered *Cassia corymbosa*, the tall growing sweetly scented Hedychiums, *Cuphea micropetala*, and *Dianella caerulea* with blue fruits carried on waving stems above the dark green leaves. *Solanum Wendlandii*, the largest flowered member of the genus, trained on the roof, is opening its first mauve blossoms.

From the northern end of the glasshouse a path leads to the Herbaceous Borders; now in full flower, they provide one of the main points of interest in the Gardens. It is not possible to mention all the plants outstanding at this season, but *Alstroemeria* 'Dover Orange,' *Anchusa* 'Morning Glory,' the blue-purple *Salvia superba*, *Verbascum paniculatum*, Phlox, Rudbeckias, the early flowering Heleniums and *Gypsophila* 'Bristol Fairy,' are all well represented. Beneath the old Apple trees a large collection of herbaceous Phlox and varieties of *Tradescantia virginiana* will be in full flower, and across the path in the Viburnum collection *Philadelphus* 'Belle Etoile' will be covered with fragrant white, purple-blotched blossoms during the early part of the month.

In Seven Acres a number of summer flowering shrubs prolong the display. *Hypericum prolificum* forms a compact bush 3-4 feet in height covered with yellow flowers. *Spiraea ariaefolia* has long branches covered with hanging white tassels and several smaller members of the genus are producing corymbs of pink blossoms. Round the pond *Butomus umbellatus* and the blue *Pontederia cordata* form a colourful foreground for the Water Lilies now in full flower. The chief interest in this section is the Heath Garden; many varieties commence flowering this month, including *Erica cinerea*, the Connemara Heath *Daboecia cantabrica*, the taller pink-flowered *E. terminalis* and later the Dorset and Cornish Heaths *E. ciliaris* and *E. vagans*; associated with these will be found a large bush of *Genista cinerea*, a late flowering Broom, and the well-known *Spartium junceum*, a valuable shrub for poor sandy soils.

The Wild Garden has been extensively replanted with Lilies and now contains a large selection of species and many of the newer hybrids; *L. pardalinum* is naturalised here and forms slowly increasing colonies in several places; *L. rubellum*, which does not increase to any great extent, has survived without replanting for many years. The recent

additions include *L. testaceum*, *L. 'Maxwill'*, *L. canadense*, *L. superbum*, *L. regale* and many others. Twining amongst the shrubs will be found the 'Flame Nasturtium,' *Tropaeolum speciosum*, while the buff-yellow *Digitalis ambigua*, a Foxglove of modest stature, is widely scattered throughout the area.

The Rhododendrons have almost completed their flowering season, but the "rearguard" *R. auriculatum*, a species from China, with lax trusses of fragrant white blossoms, will be in full flower during the early part of the month.

The Award of Garden Merit Collection contains a small border devoted to herbaceous perennials which have received this award. These include *Achillea clypeolata* with yellow flowers and silver foliage, *Erigeron 'Quakeress'* and *E. macranthus*, *Campanula persicifolia* 'Telham Beauty' and *C. lactiflora* which is widely naturalised in the Gardens with *C. latifolia*. One of the outstanding shrubs in this collection is *Genista aethnensis*, a tall growing Broom with pendant green shoots which produce abundant golden-yellow flowers during July and August.

The Rock Garden is devoted mainly to blue and mauve flowers, including many Campanulas, the summer flowering Gentians, *G. lagodechiana*, *G. septemfida* and the hybrid *G. × hascombensis*, and the Periwinkle-like blossoms of *Cyananthus microphyllus*; *Platycodon grandiflorum*, a fine plant for a rock garden or the herbaceous border, produces large purple or pearly-white Campanula-like flowers on 18-inch stems; an allied genus, *Codonopsis*, is represented by the silvery-blue *C. ovata* and *C. clematidea*.

In the Alpine House Campanulas are again represented by many well-flowered pans; *C. Waldsteiniana*, a compact dwarf, is covered with light mauve blossoms, while *C. cochlearifolia* var. *alba* has white bells on thread-like stems. Others include the deep purple *C. Stansfieldii*, the hybrid *C. 'Gremlin'* and *C. Raineri*. Several pans containing unusual hardy ferns are mixed with the flowering plants and form a useful addition to the Alpine House at this season.

Near the long Rose Borders, now in full flower, will be found the Annual Border, composed wholly of hardy and half-hardy annuals, largely sown in the positions where they are to flower and rigorously thinned out to allow each plant ample room for full development. Last year the border was severely damaged by hail just as the plants commenced to flower. Amongst those which recovered from this calamity, Eschscholtzias, Annual Chrysanthemums, Calendulas, *Amaranthus caudatus*, Echiums, *Calliopsis* 'Tom Thumb' and many-coloured Candytufts and Linarias gave a brilliant display, while a smaller border sown entirely with French and African Marigolds flowered continuously from July until cut by frost.

Beyond the Hornbeam hedge one of the old experimental plots has been devoted to a collection of annuals and vegetables with increased chromosome numbers, due to artificially induced polyploidy. These plants generally produce larger flowers and foliage than the original diploids from which they were obtained. For comparison, a number of the diploid forms are planted with the tetraploids.

Several invited trials of annuals will be in bloom on the Floral Trial Grounds, including a very large trial of *Tagetes* containing about 100 different stocks, and smaller numbers of *Godetias*, *Clarkias*, Annual *Scabious*, and *Nasturtiums*; while in other beds the large-flowered *Delphiniums*, and a new collection of *Gladiolus* will be in full flower.

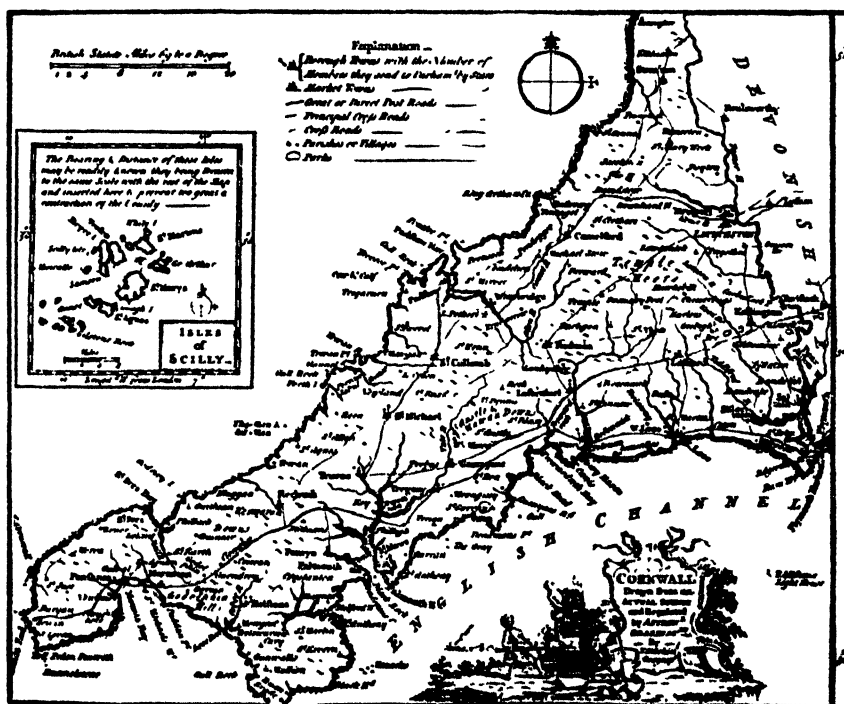
SOME NOTABLE PLANTS IN CORNISH GARDENS

Rt. Rev. J. W. Hunkin, D.D., Bishop of Truro

(Lecture given on April 20, 1948, COL. F. C. STERN, F.L.S., V.M.H.,
in the Chair)

THE map of England shows Cornwall as a projection like a long boot to the south-west. Cape Cornwall (not the Land's End) was known in the Middle Ages as *Cauda Mundi*—"the tail of the world." No other British county has so long a coast line. At its narrowest it is only 6 miles across (from St. Ives to Mount's Bay). There is no place in Cornwall more than 25 miles from the sea.

The climate of Cornwall is accordingly mild and equable. At Penzance the mean summer temperature is about 62° and the mean



CORNWALL—AN EIGHTEENTH-CENTURY MAP

winter temperature about 45°. There is a saying that Cornwall has a shower of rain for every day of the week and two for Sunday. Certainly we have a good deal of mist and dampness and grey weather; and we feel the full force of great gales from the south-west and the south-east. As for the soil, a great deal of it is of the acid sort beloved of the huge family of ericaceous plants.

With these conditions it is not surprising that Camellias, Hydrangeas, Magnolias, Rhododendrons and Azaleas from the Himalayas, Tibet and China, with a great many plants from the Southern Hemisphere—New Zealand as well as South America—*Drimys*, *Escallonia*, *Fuchsia*, *Griselinia*, *Hoheria*, *Leptospermum*, *Nothofagus*, *Olearia*, *Pittosporum*, *Senecio* and so on, flourish and abound. The range of plants hardy in the county would be considerably wider, were it not for the bursts of frost which now seem to come every few years. The severe wind-frost of 1938–1939, and the still more severe frost of 1946–1947, did a great deal of damage. Indeed, Cornish gardeners have practically given up trying such plants as *Acacia*, *Candollea*, *Eriostemon*, *Metrosideros*, *Cassia corymbosa*, *Cinnamomum camphora*, *Clethra arborea*, *Leucadendron argenteum*, *Sparmannia africana* and *Prostanthera rotundifolia*. The finest specimen of the last named of these ever seen by the late MR. BEAN was in CANON BOSCAWEN's garden at Ludgvan. Cornwall is also much discouraged about Eucalyptus. The great collection of Eucalyptus at Menabilly (near Fowey) has perished with only one or two survivors (*E. Gunnii*, I think). There are still three big Eucalyptus at Tregrehan (near Par): *E. cordata*, *globulus* and *Gunnii*—I saw them a few weeks ago. I also saw a rather dishevelled specimen at Pentillie Castle, and a couple in still worse plight at Treliassick on Falmouth Harbour. But MR. ARNOLD-FORSTER still has one or two growing happily in his wind-swept graden at Zennor near St. Ives, and he thinks that the hardier species like *E. Gunnii*, *E. coccifera* and *E. urnigera* should do well.

The subject of this lecture is "*some notable plants in Cornish Gardens*"; and certainly, though we have had very severe casualties, there are still a number of magnificent specimens to be found up and down the county. In a short paper I cannot, of course, attempt to cover the whole ground, and I must be content with a somewhat arbitrary selection. I shall confine myself to a few gardens in the south-west of the County: chiefly Trengwainton, COLONEL BOLITHO's garden near Penzance; Trewithen, MR. GEORGE JOHNSTONE's garden near Grampound; and Caerhays, the late MR. JOHN CHARLES WILLIAMS' garden, now inherited by his son, MR. CHARLES WILLIAMS, on the coast south of St. Austell. Other gardens from which we shall see specimens are Lanarth, the fascinating garden near St. Keverne created by the late MR. P. D. WILLIAMS and now cared for by his son, MR. MICHAEL WILLIAMS; MR. ARNOLD-FORSTER's at Eagles' Nest, Zennor; MR. TREVE HOLMAN's at Chyverton near Truro; with a single specimen to remind us of the lovely garden of the Fox family at Penjerrick near Falmouth: one also from MRS. CHARLES WILLIAMS' garden at Trewidden, and from MR. LEONARD HOLMAN's garden at Camborne.

This map of Cornwall is an old eighteenth-century map, the century when the LEMON family began reigning at Carclew (near Truro). In

the following century SIR CHARLES LEMON made Carclew one of the famous gardens of the south-west of England. It used to contain an enormous *Rhododendron arboreum* planted by SIR CHARLES about 1850 (recently dead), and a magnificent specimen of *Pinus patula* now reduced to a scarecrow.

Before I come to the present I should like just to touch on the past, but I must not go back so far as to SIR CHARLES. I would begin with the late CAPT. WILLIAM STACKHOUSE CHURCH PINWILL at Trehane, near Probus. He was born in 1831 and was on his way to the Crimean war when the war ended, and he proceeded with his regiment to India. Later on he retired and settled in the family place at Trehane, where he not only produced marvellous specimens of flowers and fruit in remarkable quantities, but was also the friend and encourager of the younger gardeners of the next generation. He died at Trehane on May 30, 1926, aged 95 years. Trehane now is almost no more. The fine Queen Anne house was recently burned down, and the garden was allowed to go wild during the recent war. A few of the old plants, however, remain: notably a *Magnolia Campbellii*, a great grafted tree, 45 feet high, which bore 1,500 flowers in 1906. COL. PINWILL, the son and heir of CAPT. PINWILL, kindly lent me some old photographs, and the next two plants were growing at Trehane.

Orchis foliosa, the Madeira Orchis, with rose-purple flowers in April. CAPTAIN PINWILL took the greatest personal interest in all his plants. He rose each morning at 5 A.M. and worked in the garden all day. As a cultivator he was unsurpassed, for he studied the special needs of individual plants.

Trachelospermum jasminoides. This is a fine healthy specimen of a charming bush climber, introduced from China in 1844. It should be much better known than it is. I have one climbing the wall just outside my study window. For weeks in July and August it is covered with sweet little white flowers, the scent of which floats deliciously in at the window.

A great friend of CAPTAIN PINWILL'S was the Rector of Lamorran, the HON. TOWNSHEND BOSCAWEN. MR. BOSCAWEN'S son proved to be an even greater gardener than his father. The late CANON ARTHUR BOSCAWEN was Rector of Ludgvan near Penzance for forty-six years (1893-1939). The photograph (Fig. 77) shows him standing by his tall *Eucryphia nymansensis*. It must be one of the earliest specimens of this distinguished hybrid to reach such a size. CANON BOSCAWEN made his Rectory garden one of the most interesting and beautiful in England. Most of his plants he put in with his own hands. Among many other notable items he had an unrivalled collection of New Zealanders: *Leptospermum*, *Olearia*, *Pittosporum*, *Veronica*, and so on.

I should like just to refer to the plants which that great Cornish plant-collector, WILLIAM LOBB, sent to Scorrier, where as a boy he had been employed in MR. WILLIAMS' garden. I intended to photograph a large tree-myrtle, *Eugenia apiculata*, which is said to have been sent by him to MR. WILLIAMS, but it was nearly killed in the winter of 1946-1947, and though it is recovering and showing a multitude of young fresh shoots, it is still too dishevelled to sit for a photograph.

I also contemplated two other photographs from Tregothnan: one of the long stable wall which in the month of March is generally magnificently decorated with the hundreds of flowers of nine large Camellias growing against it. But this year it has been a sorry sight as the flowers have been miserably brown with the frost. The other photograph would have been of a path lined with Tree Ferns to the number of over a hundred: but the shade makes it almost impossible for a photograph to do justice to the reality.

Magnolia stellata. MR. BEAN says that for small gardens this is the most desirable of all Magnolias. I quite agree. This is an unusually large specimen from my garden at Lis Escop. On the very afternoon when I was writing this lecture the plant was such a perfect vision of fragrant whiteness that I felt I could not omit it.

And now at last after this somewhat extended prologomenon I reach the gardens which I have mentioned, and I begin with some plants in MR. ARNOLD FORSTER'S garden at Zennor.

Senecio rotundifolius. The photograph (Fig. 84) gives an idea of the position of the plant 600 feet above the Atlantic Ocean. There is nothing between it and New York. Its large, round, shining, leathery leaves have a remarkable power of withstanding fierce spray-laden gales. Its terminal clusters of flower-heads are of a rather dingy yellowish-white, and have a somewhat unpleasant smell.

Olearia lacunosa, easily the finest plant of this species in Europe. It has not yet flowered; but its foliage is very distinct and striking.

Olearia albida (often called *O. oleifolia*) makes a bush about 8 feet high, if grown in full exposure. It bears very profuse heads of white flowers in August, faintly, but very pleasantly, scented, especially when the air is damp.

Rhododendron leucaspis—in full sun and wind, smothered with little saucers of milk in February. It flowers at a very early stage when raised from seed, and forms a bushy undershrub of 1-2 feet in height. It came from Tibet, where it was discovered by KINGDON-WARD and introduced in 1925.

Rhododendron 'Lady Alice Fitzwilliam,' a lovely hybrid with an exquisite scent of celestial nutmeg. She is rather a frail creature and flowers herself almost to death. The *Rhododendron* Group give her three stars and she was awarded F.C.C. in 1881: and well she deserves it. MR. ARNOLD-FORSTER gives her such sheltered nooks as his exposed and rocky garden can provide.

MR. ARNOLD-FORSTER is not only an experienced and accomplished gardener, but he is also distinguished as a painter; and he has a remarkable power of vivid description. He has in the press a book which he was asked to write by the Cornwall Branch of the Council for the Preservation of Rural England on *Shrubs for the Milder Counties*. Zennor is the furthest point to which our travel takes us, and we now retire towards the rest of England.

First we come to that most lovely Magnolia, *M. Campbellii* at Tre-widden near Penzance. *M. Campbellii* is a forest tree in the Himalayas and has both pink- and white-flowered forms. The pink flowers, 10 inches across, white on the inside, are gorgeous. *M. Campbellii* has two

well-known drawbacks. First, it does not flower till it is 20 years old or more: and secondly, as it both flowers and opens its leaves in February, it is apt to be injured both in flower and growth by spring frosts.

From Trengwainton, the garden which COL. E. H. W. BOLITHO has developed with so much care and success, the next eight plants are taken.

Erica canaliculata (often wrongly called *E. melanthera*) from South Africa (Fig. 85). This fine form of it came from CANON BOSCAWEN'S garden at Ludgvan. It begins to bloom early in the year and continues one of the most beautiful of flowering shrubs for three months.

Embothrium longifolium gives a wonderful display of red fireworks in May. It is hardier than *E. coccineum*. These brilliant Chileans are often seen in South Cornwall, sometimes in unexpected places. There are two or three fine specimens in gardens on the St. Austell by-pass.

An outstanding hybrid *Olearia* from Tresco, known, I believe, as *O. × scilloniensis*. It is a hybrid of *O. stellulata*, but brighter and better.

Magnolia Sargentiana, of which there are two forms in cultivation. This is *M. Sargentiana robusta*, the more fastigate.

Styrax Hemsleyanum, introduced from China by WILSON in 1900, with pure white flowers.

Leptospermum eximium, a striking specimen of an unusual *Leptospermum*. (Fig. 75.)

COL. BOLITHO also grows at Trengwainton many outstanding *Rhododendron* species and hybrids. My photograph (Fig. 82) shows *R. Griersonianum*, four-starred in the *Rhododendron* Group's list. It produces its bright geranium-scarlet flowers in June. It comes from China and is named after R. C. GRIERSON, a Chinese Customs Officer, friend and helper of that great plant-collector, GEORGE FORREST.

Rhododendron Taggianum—of the *megacalyx* sub-section of the *Maddenii* series. Its flowers, pure white with a yellow blotch, are deliciously fragrant. It was discovered in 1925-1926 by GEORGE FORREST in N.E. Burma.

Tricuspidaria lanceolata (now *Crinodendron Hookerianum*) in a garden at Carbis Bay, smothered in flower (with the long urn-shaped pendant corollas of rich crimson). It was introduced by WILLIAM LOBB just a hundred years ago (1848). At Trewithen there is a tall hedge of it.

Travelling east we come next to Camborne. I do not think you could find a finer specimen of *Cornus capitata* than this shapely tree in MR. HOLMAN'S garden at Rosewarne (Fig. 81). The oldest *Benthamias* (as they used to be called) in the country are at Heligan, where in 1832 MR. J. H. TREMAYNE planted them along his drive, which during the summer used to be a mass of flowers. Not long ago I was at Heligan, and I saw some aged survivors of this planting. They are very tall and lanky, and are worthy of great respect as veterans though no longer as beauties.

Keeping near the north coast we go on to Chyverton, where there is a big *Leptospermum flavesces*, var. *obovatum* from Australia.

Here also *Rhododendron* 'Princess Alice' makes a charming picture in full sunshine. She was awarded F.C.C. in 1862 and has three stars in the *Rhododendron* Group's list, and her white flowers in a situation like this are very beautiful.

Now we turn south again: to Trewithen, between Probus and Grampound; and to Caerhays, by the English Channel.

First, however, let us make a detour further to the south-west and look over the gates of Penjerrick and into Lanarth. Penjerrick is lovely, with a great sweep of lawn down the hill towards the sea. It was one of the first gardens to receive seeds of Himalayan Rhododendrons. Some outstanding Rhododendron hybrids originated here. This photograph (Fig. 83) shows a fine example: *R. Barclayi* var. 'Robert Fox,' called after ROBERT WERE FOX, F.R.S. (1789-1877), to whom the development of the garden is largely due. The flowers are a deep blood-red, and the Rhododendron is given four stars by the Rhododendron Group. *R. Barclayi* is a cross between *Thomsonii* and 'Glory of Penjerrick'; and 'Glory of Penjerrick' is itself a cross between *arboreum* and *Griffithianum*. Other famous hybrids created at Penjerrick are 'Cornish Cross' (*Thomsonii* \times *Griffithianum*), with rose-pink flowers, and 'Cornubia' (*arboreum* \times *Shilsonii*—*Shilsonii* being a cross between *Thomsonii* and *barbatum*) with flowers of blood-red about Christmas.

Cornish gardens, it will be remembered, are responsible for a large number of beautiful hybrids: some of them very outstanding, e.g. MR. JOHN CHARLES WILLIAMS' 'Blue Tit' (*impeditum* \times *Augustinii*); and his 'Royal Flush' (*cinnabarinum* \times *Maddenii*) one of the finest Rhododendron hybrids ever produced. It is to be hoped that there are more to come. About two years ago I was in the garden of the late CAPTAIN E. J. P. MAGOR at Lamellen (between Wadebridge and Camelford), and I saw a medium-sized Rhododendron laden with large trusses of a beautiful clear light pink. It was one of CAPTAIN MAGOR'S own hybrids (*Thomsonii* \times *detonsum*) not yet named. CAPTAIN MAGOR used to define an optimist as a man suffering from angina pectoris who goes on sowing rhododendron seed—he died of angina pectoris himself.

But it is time we made our dash south-west to Lanarth. The garden established there by the late MR. P. D. WILLIAMS is just seething with interest. I must content myself with the bare mention of a few of the most remarkable groups of plants.

The collection of Southern Beeches must be one of the finest in the country. They include *Nothofagus antarctica* (a spreading tree, now about 40 feet high), the slender *N. Cunninghamii*, *N. Dombeyi* (the biggest), *N. fusca* (40 feet), which a year or two ago had a jay's nest in it, *N. Menziesii*, *Moorei*, and *obliqua* (a lovely fresh green at this moment). Other Cornish gardens have interesting specimens of this genus, including the rare *N. betuloides* at Pencarrow, SIR JOHN MOLESWORTH ST. AUBYN's place near Bodmin.

What is now a magnificent group of Myrtles at Lanarth were brought from the Pyrenees by MR. P. D. WILLIAMS as tiny plants in a matchbox. For many years the enormous flowers from the great plants of *Camellia reticulata* used regularly to win the prize at the Cornwall Spring Flower Show. The Lanarth variety of *Viburnum tomentosum Mariesii* is justly famous. During the last two years there have unfortunately been some notable casualties. The two fine *Acacia melanoxylon* are dead: so is the famous *Carrierea calycina*, the first to flower in England. But many rarities are still alive. That handsome evergreen,

Maytenus Boaria seeds itself. There are fine specimens of *Manglietia Hookeri* (30 feet high); *Weinmannia trichosperma*, with its fern-like leaves; *Rhodoleia Championii*, very rare, and the first plant to flower in England—the flowers a disappointing dull purple (a great *Nothofagus obliqua* fell on it, but it is coming again); and *Emmenopterys Henryi*, which Wilson described as “one of the most strikingly beautiful trees of Chinese forests.” But it has not yet flowered.

The size of some of the plants at Lanarth is enormous, e.g. *Hamelis mollis*, 18 feet high, 27 feet across, swathed with lichen but all the more striking when lit up with little yellow flowers in winter, Bamboos (*Arundinaria fastuosa*, etc.), *Drimys Winteri*, *Griselinia* and a *Pittosporum tenuifolium*, 50 feet high; a great *Davidia laeta* formed by two trees planted so close that they grew into one another (P. D. WILLIAMS having had a competition with his cousin, J. C., as to which could grow the larger *Davidia*).

Magnolia Dawsoniana at Lanarth (Fig. 76). This *Magnolia* first flowered in England in this garden, a pale pink, in the Spring of 1936. It had 1,000 flowers last year, but will have none this year. Here it is in flower, looking upward. Here is a “close-up” of individual flowers of *M. Dawsoniana* (though, as a matter of fact, these were on a tree at Caerhays).

Last year a lovely variety of *Magnolia mollicomata* raised from FORREST’s seed (25655), of a Cyclamen-purple, received an award of the F.C.C. (April 15). There are, I believe, only two other of these plants in the country; and this is the largest so far and the first to flower. It was named *var.* ‘Lanarth.’

The whole collection of *Magnolias* at Lanarth must be one of the most remarkable in England. There is a magnificent *M. Delavayi* (30 feet by 30 feet), with its huge leaves—MR. J. C. WILLIAMS’ favourite evergreen, with large fragrant flowers which open at night; and there was a *M. hypoleuca* of about the same age, perhaps the largest in England, till it blew down in 1943.

One of the leading authorities on *Magnolias* at the present time is MR. GEORGE JOHNSTONE of Trewithen, to whose garden we now come.

M. mollicomata (Fig. 74) in his beautiful garden, the main part of which consists of a wide border round a long curving lawn. It is not only a gardener’s garden, but a landscape garden as well.

M. mollicomata corresponds in China, where it was discovered by GEORGE FORREST, to *M. Campbellii* in the Himalayas. It flowers later and is more compact in habit. The colour, which is a good pink, is mainly at the base of the petal. We shall see a lovely tree of this species at Caerhays. (Fig. 78.)

Rhododendron Macabeaeum, the truss from Trewithen which won the first prize at the Cornwall Spring Flower Show of 1946. Its foliage is magnificent, and the flowers are a beautiful pale yellow. It was introduced by KINGDON-WARD in 1928–1929.

R. sinogrande, of the same *Rhododendron* series, also with fine foliage and creamy-white flowers—a magnificent foliage plant.

Another plant which does splendidly at Trewithen is *Pieris Forrestii*. Even more attractive than its fragrant white flowers are its young leaves of an almost unbelievable rich bright red.

The largest *Pieris* in the county is a huge plant of *P. formosa*, 20 feet in height with a spread of 30 feet, at Pentillie Castle. I saw it on Sunday, February 15, this year. It is a charming sight early in May, covered with clusters of panicles of little white flowers. The great bush now straddles over the path, and CAPTAIN CORYTON has been advised to move the path rather than cut back so notable a plant.

Camellia reticulata (type); and *Camellia reticulata* (*sempilena*), of which MR. JOHNSTONE has an outstanding form (salmon-pink). But we must leave further remarks on Camellias until we come to Caerhays. There are many other plants of unusual interest at Trewithen, and it must suffice merely to mention three:

Schima khasiana which, when MR. JUDD of the Arnold Arboretum saw it in full flower, he said that it was worth coming all the way over the Atlantic to see.

Myrtus Lechleriana. A tall bush of this rare Myrtle was covered in bud earlier this year and would have been a delightful great column of white flower, if it had not been for the sharp frost which destroyed every bud.

Rhederodendron macrocarpum, discovered by PROFESSOR HU in Western China and introduced in 1934. This fine specimen first flowered, I think, in 1944. This year it is smothered in blossom.

But we must not linger; for we must allow time for the greatest of all the gardens in the West of England, Caerhays.

Look at this superb photograph of *Magnolia mollicomata* (Fig. 78). The full bloom on the tree will last four or five days, or a fortnight in mild weather. From seed sown in 1926 at Werrington Park a *M. mollicomata* flowered for the first time in 1941. The Chinese garden on a North slope at Werrington Park is a daughter garden to Caerhays; and COMMANDER A. M. WILLIAMS, the second surviving son of MR. JOHN CHARLES WILLIAMS, has a most interesting collection of Rhododendrons and other plants. It includes, for example, a great hedge of *Osmanthus Delavayi* with its small dark green leaves and its masses of little white, scented flowers; and another hedge of about fifty large plants of *Stranvaesia undulata*, with its handsome red fruits. The late MR. W. J. BEAN was astonished at its size when, on a visit to Werrington, he scrambled through it. At Werrington are the original plants of *Rhododendron* 'May Day' (*haematodes* × *Griersonianum*). Squirrels are very fond of the buds of this Rhododendron. They are the little red squirrels, and on the plant they are very difficult to detect. The grey squirrel, happily, has not yet crossed the Tamar into Cornwall. Werrington is just on the border, and MR. R. M. GREGORY, the very observant and experienced head gardener, told me that only once had he ever seen a grey squirrel in the garden.

Magnolia Sprengeri diva, is one of the very finest of all known Magnolias with cup-shaped flowers of a lovely pink (Fig. 79). MR. GREGORY of Werrington as a young man was employed at Caerhays; and when he came back from the 1914-1918 war, MR. J. C. WILLIAMS asked him whether he had noticed anything fresh in the garden. MR. GREGORY said "yes" and mentioned the Magnolia. "It is the only one West of China," MR. JOHN CHARLES WILLIAMS said, "and I want to distribute it everywhere." Seedlings have accordingly been very generously

distributed from Caerhays. They have not proved to bear flowers both of so fine a pink colour and so lovely a shape as the parent; but some of them are very fine. LORD ABERCONWAY obtained an Award of Merit for his; and only a fortnight ago a flower from a seedling from Wakehurst (now 27 feet high) received unanimously a similar award. It was of a lovely delicate pink but not of the shape as its parent at Caerhays. You must imagine these lovely flowers against the blue sky to understand their full glory.

M. Sprengeri diva is the only early flowering Magnolia at Caerhays which has not been seriously frosted this year.

Just as remarkable as the Caerhays Magnolias are the Caerhays Camellias.

Camellia saluenensis was discovered by GEORGE FORREST near the Salwin river in Western China and was first cultivated at Caerhays. It has lovely flowers of blush pink.

MR. J. C. WILLIAMS obtained some delightful hybrids by crossing *C. saluenensis* with *C. japonica*, the well-known Camellia with black dots on its leaves.

Here is one of his crosses called after him 'J. C. Williams.' This picture was actually taken from a plant at Eagles' Nest. Also at Caerhays is the original plant of another cross from the same parents, with flowers of darker pink, called after MRS. WILLIAMS: 'Mary Christian' (Fig. 8o). The *japonica* blood has made these hybrids hardier.

Still another hybrid from the same parents was awarded the A.M. on April 1, 1947: 'St. Ewe.' Its large flowers have rose-madder petals and a central cluster of bright yellow stamens.

A beautiful form of *C. reticulata* with flowers 4 inches across, whose petals range in colour from crimson to rose-madder, has been called 'Mary Williams.'

I was last at Caerhays on Sunday, March 7, and I saw scores of Camellias of various sizes and sorts, the largest plant of all being some 25 feet high by as many thick. And they were smothered with thousands and thousands of flowers.

I now come to the concluding section of this lecture.

And here, for a particular reason, I interpolate a picture taken on March 9, at Trewithen. MR. GEORGE JOHNSTONE by the side of one of his Camellias. MR. JOHNSTONE is about six feet in height, and the Camellia is more than twice his height. But my special reason for showing it is found on the right-hand corner of the picture. Here are some of the glowing red berries of *Viburnum betulifolium* which have survived right through the winter. MR. JOHNSTONE has a clump of these plants some 15 feet high, weighed down by a cascade of translucent red, which is one of the great winter sights of the County. Other people have tried this *Viburnum* and been disappointed with it. The truth is that you have to wait for twelve years or more before you receive your rich reward.

I had hoped that I might be able to obtain a coloured photograph of the great tree of *Michelia Doltsopa*, as I saw it on April 8, 1945, flowering all over, the flowers large and white, with a peculiar aromatic scent. But the Michelias this year have been badly frosted and there will be little, if any, flower.

At Caerhays we begin with *Azalea obtusum* (var. *amoenum*) along the

drive, which leads gently down the half mile from the lodge gate to the Castle. Azaleas do splendidly in Cornwall, and we should grow more of them. One of the most magnificent sights at Lanarth are the Azaleas in May. Some of our Cornish Azaleas are very old. In MR. P. M. WILLIAMS' garden at Burncoose, for instance, are two enormous old *Azalea pontica* (*Rhododendron luteum* or *flavum*) with masses of very sweetly scented flowers of soft yellow in May, and a fine autumn colouring.

Here is another picture of *Azalea obtusum* (var. *amoenum*). And my mind goes back to a bed of *Azalea obtusum* var. 'Hinodegiri' at Lanarth, a sheet of purple at the top of a rising sweep of lawn.

The Rhododendrons at Caerhays are on a par with its Magnolias and Camellias. There are scores of outstanding plants impressively arranged in groups, both species and hybrids. MR. J. C. WILLIAMS would make perhaps twenty or thirty crosses a year. It would take about four years to see what a small hybrid was like, and eight to twelve to judge a large one. MR. WILLIAMS' standards were exceptionally high and he discarded ruthlessly.

R. 'Mrs. Butler' \times 'Blood-red' *arboreum*. 'Mrs. Butler' herself is pale pink; and is probably a form of *Fortunei*, one of the hardiest of Chinese Rhododendrons.

Here is 'Orange Bill' *R. concatenans*, one of KINGDON-WARD's discoveries. The name *concatenans*—"linking together"—is applied to this Rhododendron as a link between the Cinnabarinum and Triflorum series. It has bell-shaped flowers of apricot colour. An interesting hybrid between this and *R. yunnanense* has trusses of nine to ten flowers, amber flushed with pink. It was made by MR. GEORGE JOHNSTONE, and called after MRS. JOHNSTONE, 'Alison Johnstone' (A.M. April 17, 1945).

R. Williamsianum \times *chartophyllum*. *R. Williamsianum* is a small shrub of rounded shape, discovered and introduced by WILSON from Western China, with young shoots of bronze, small heart-shaped leaves and flowers of a beautiful clear shell-pink. It is one of the most attractive of all Rhododendrons and is fittingly named after MR. J. C. WILLIAMS himself. *R. chartophyllum* (which means "with paper-like leaves") is a Chinese Rhododendron very much like *yunnanense*. Here is *R. Williamsianum* \times *dichroanthum*. *R. dichroanthum* (which means "with two-coloured flowers") is a small shrub with delightful flowers ranging from deep orange to salmon-pink. It is one of FORREST's introductions from China.

R. 'Crossbill.' This is one of MR. J. C. WILLIAMS' crosses, *lutescens* \times *spinuliferum*.

My last two pictures are of *Magnolia Sprengeri diva*. It is pleasant to reflect that the Magnolia is a tree once native in Europe, but ages ago driven away by natural causes; and now, after long banishment, brought home again by man.

The Editor wishes to acknowledge with thanks the kind permission of MR. ARNOLD-FORSTER and MESSRS. COUNTRY LIFE, LTD., to use the copyright photographs appearing in Figs. 78, 80, 81, 83, 84 and 85. These illustrations will appear shortly in MR. ARNOLD FORSTER's forthcoming book *Shrubs for the Milder Counties*.

METASEQUOIA, A LIVING RELICT OF A FOSSIL GENUS

Professor E. D. Merrill

(ARNOLD ARBORETUM, HARVARD UNIVERSITY, U.S.A.)

GINKGO BILOBA, a monotypic genus of very ancient lineage, in fact from the standpoint of geologic history, outside of the Cycadaceae, the most ancient of living trees, is often spoken of as a "living fossil." The sole species, once of very wide geographic distribution in the North Temperate Zone of both hemispheres, can scarcely be distinguished from fossil forms of ancient Mesozoic times. This is a beautiful example of the persistence of selected life forms, in highly organized groups, through many millions of years. *Ginkgo* has persisted in cultivation in China, but there are a few places in that country where it is spontaneous in limited forested areas. Whether or not it is truly native in such places, or merely occurs as a descendant from planted trees, is not definitely known. It was introduced into Japan about A.D. 700, into Europe about 1730 and into the United States in 1784. Now another striking case develops, not quite as old geologically as is the *Ginkgo*, through a remarkable discovery originally made by MR. T. WANG in 1945. *Metasequoia*, previously known only from palaeobotanic records is now shown to exist in the form of a single living species in a very limited area, and it, or its immediate ancestry, goes back to Mesozoic times.

In the same geologic era, the Mesozoic, when the world fauna was dominated by the great reptiles, the land vegetation was largely dominated by the Gymnosperms, the primitive plants, and a great many of the genera which then evolved are still represented by living species. This was particularly true of the Triassic and Jurassic times, but in the Cretaceous many types of Angiosperms, the highest group of flowering plants, had appeared on the scene. Various genera of these ancient Gymnosperms have persisted throughout geologic time to the present including *Ginkgo*, mentioned above, the genera of living Cycadaceae (the most primitive of living flowering plants) and many of the genera of that large group commonly known as the Coniferae, which make up the great evergreen forests of temperate regions with which we are so familiar. Thus it was, as to time of origin from a geologic standpoint, that the period of development of and dominance of the great reptiles coincided with that of the primitive flowering plants; but while the great reptiles have disappeared from the scene, many of the genera of Gymnosperms have persisted, and, especially in the temperate regions, still dominate the vegetation of vast areas, particularly in the North Temperate Zone. Actually some of the living Gymnosperms can scarcely be distinguished from the fossil forms of ancient Mesozoic times.

The Mesozoic era has been defined as a succession of ages extending over a few hundred million years, but modern estimates place its duration as about 130 million years; even this last estimate is impressive enough, for to it must be added perhaps another 50 million years covered by the Tertiary down to the present time. It was towards the end of the Mesozoic era, in the Cretaceous, that the families and genera of many of the striking and most highly developed groups of flowering plants

originated, the Angiosperms as contrasted to the more primitive Gymnosperms. While the animal kingdom in Mesozoic times was dominated by the great reptiles, particularly towards the end of that era, in the Cretaceous, the mammals were also developing, although during the Mesozoic none of the modern types was known and none of the immediate ancestors of man had appeared on the scene.

MR. WANG'S fragmentary specimens of 1945 were supplemented by additional material collected in the following year, originally three large trees representing this strange conifer having been located in north-eastern Szechuan, very close to the Hupeh border. With the additional collections made in 1946, the discovery then developed into one of extraordinary interest in that the tree proved to be a living species of a genus, *Metasequoia*, which, up to that time, had been known only from palaeobotanic records. Various species of North America and Asia originally ascribed to the genus *Sequoia* as fossil forms, proved not to belong in that genus, and in 1941 the new genus *Metasequoia* was proposed to accommodate these; and only four years after that genus was described, a living species was actually found in China. This, because of the ancient lineage of *Metasequoia*, and its former wide geographic distribution (various parts of North America, Japan, Saghalien, Manchuria), is a most extraordinary circumstance. The proposed palaeobotanic species are *Metasequoia heerii* from North America, *M. japonica* and *M. disticha* from Japan, and *M. chinensis* from Manchuria and Saghalien. Assuming that all of these extinct species are actually congeneric, then, in former geologic times, *Metasequoia* was a genus of very wide geographic distribution, as was *Ginkgo*. The latter is represented by only a single living species and this apparently now persisting only because it was preserved in cultivation in China. And now this striking *Metasequoia* is found, confined to a relatively few individual trees scattered along small streams and on the slopes of north-eastern Szechuan and the adjacent parts of Hupeh.

It is sufficiently extraordinary that only four years after *Metasequoia* was actually described from the fossil records, that a living species of the genus should be found in China; but what is perhaps even more extraordinary is that when found, this living species, the sole surviving representative of a former widely distributed genus, was apparently not far from the verge of extinction as a living entity in its native habitat.

As noted above, the first observer located only three trees. A second expedition was sent out by PROFESSOR WAN-CHUN CHENG of the National Central University, Nanking, in 1946, and MR. C. J. HSUEH, his assistant who led this expedition brought the census up to about 25 trees. When botanical specimens were received at the Arnold Arboretum in the latter part of 1946 I immediately became interested in the possibility of securing seeds of this extraordinary species, and accordingly communicated with DR. H. H. HU, Director of the Fan Memorial Institute of Biology in Peiping, one of the joint authors concerned with the actual description of the species. Incidentally DR. HU was trained at the Arnold Arboretum, receiving his Sc.D. degree from Harvard University in 1925. DR. HU responded favourably and accordingly a modest grant was made from the Arnold Arboretum restricted Chinese exploration

fund provided by the late HARRISON W. SMITH of Tahiti, himself a graduate of Harvard in 1895 and long interested in matters Chinese. On the basis of this grant PROFESSOR CHENG organized a third expedition to the type locality, this also led by his assistant MR. HSUEH. He flew from Nanking to Chungking on September 3, 1947, and arrived at Mou-tao-chi, 110 km. east of Wan-hsien, Szechuan, on September 11, where the type of the species was originally discovered (Fig. 86). This is very close to the Hupeh border. He spent approximately three months prosecuting field work in this part of Szechuan and in adjacent parts of Hupeh. He reports somewhat more than 100 large trees representing the species, occurring on slopes, along small streams, and near rice paddies (some of the trees planted) between the altitudes of 900 and 1,300 m. scattered over an area of about 800 square kilometres. This is a region of considerable rainfall, with some ice and snow in the winter months. The centre of its greatest abundance is in the Shui-sa-pa valley in Hupeh Province, where there are at least 1,000 of the trees, including the small ones; but there are no groves or forests made up of the species. In other places such as Houn-ping-yang and Mou-tao-chi, there are only a very few trees. It is of interest to note that the valley where most of the trees are now found takes its name from that of the tree, the tree itself known as *shui-sa* (*shui* = water, *sa* = fir or spruce), the place of its greatest occurrence being Shui-sa-pa. DR. CHANEY of the Palaeontological Department of the University of California also visited the *Metasequoia* area and reported "the trees grew best beside streams or elsewhere in wet soil: it is not found at elevations far above 4,000 feet, for it appears to require mild winter temperature. Its associates in the forest are Chestnut, Sweet Gum, Oak and Birch, all of which trees grow to-day in many parts of the United States."

The largest tree which was measured was 35 m. high, its trunk 2.3 m. in diameter. While 1947 was reported as not being a good seed year, an ample supply of seeds was secured during the time that MR. HSUEH was in the field. These were delivered in Nanking early in December; the first small sending reached Boston January 5, 1948, and a second and larger shipment is now in transit. Seeds were planted in our propagating house early in January, and many of these germinated before the end of the month. Thus it is that in due time the Arnold Arboretum will have a certain number of living plants for distribution.

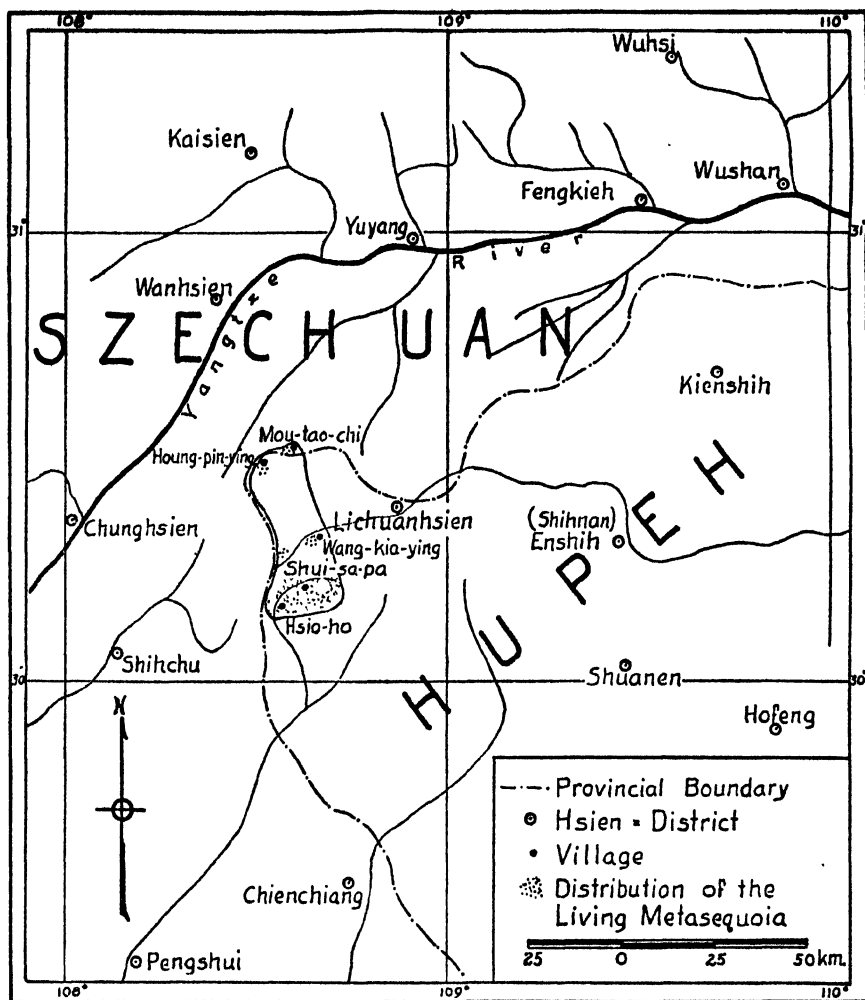
Following long established Arnold Arboretum practice, packets of seeds have been widely distributed to institutions in the United States and Europe. It is, of course, not known whether or not this remarkable species will prove to be hardy under the rather difficult climatic conditions characteristic of the Boston area. With excellent germination records it is now certain that we shall be able to establish this ancient but now nearly extinct type in various parts of the United States and elsewhere, for somewhere, with us, favourable climatic conditions will be found—if not in the north-east, then in the south or on the west coast. The point is emphasized that in spite of the present unfavourable economic conditions, in spite of adversities in China rendering travel difficult, and in spite of unfavourable exchange conditions, this co-operative project did succeed; that as a result an ample supply of seeds

is available; that the seeds are viable; and, this being the case, the Arnold Arboretum has made an important contribution, working through its Chinese associates, in thus being involved in an attempt to preserve a remarkable conifer, and a species that in its native habitat is apparently not far from the verge of extinction. Incidentally PROFESSOR CHENG who, with DR. HU, co-operated with us, writes that without the modest grant made by the Arnold Arboretum, it would have been impossible for his representative to make the trip to Szechuan and Hupeh in 1947, and comments on the fact that trees are being rapidly destroyed by cutting in this region as well as in various other parts of China. He specifically mentioned *Picea heterolepis* Rehder & Wilson, which was described in 1914 from collections made by E. H. WILSON for the Arnold Arboretum in western Szechuan, in 1910, and a species now growing in our grounds. Not a single tree can now be found in the type locality, nor have the Chinese botanists been able to locate the species anywhere since 1932. The actual grant made by the Arnold Arboretum to finance this trip to Szechuan in 1947 was only \$250.00 which, because of the extreme inflation, actually yielded \$9,750,000 in Chinese currency. This will give some idea of the current financial difficulties under which the Chinese botanists are carrying on their work.

This new "living fossil" is a tree, attaining a height of at least 115 feet with a trunk diameter of at least $7\frac{1}{2}$ feet. One of its striking characteristics is that, like the various species of *Larix* (Larch) and *Pseudolarix* (Golden Larch), and our *Taxodium* (Swamp Cypress) its leaves are deciduous, the trees being leafless in the winter months. In general appearance the leafy branchlets suggest those of the genus *Glyptostrobus*. It is needless to repeat here the technical characters of this remarkable species, as these will be available when the formal description is published.* All I have attempted to do has been to give the high lights regarding this remarkable discovery, and to call attention to the fact that viable seeds of the species have been received, from which young plants are now being grown.

It has been argued in some quarters that we approach the condition of diminishing returns in the botanical exploration of China, a field that has long been one in which the Arnold Arboretum has specialized. This statement is doubtless true to a certain degree, but from what has appeared in extensive collections made within the past three decades, I am still of the opinion that a vast amount of field work is still called for and is still justified. This remarkable *Metasequoia* find bears out this belief. In spite of all that has been published on the enormously rich flora of China in the past century, and particularly within the past four or five decades, there are vast areas still remaining to be explored, and the already known flora will be greatly increased, as to the number of actually known species, when the more recently assembled collections are studied in detail.

* *Editor's Note.*—It is understood that the formal description of this species will be published shortly by DR. HU, under the name of *Metasequoia glyptostroboides*, under which name LORD ABERCONWAY referred to this plant in his Presidential address for this year. .



Sketch map showing the limited geographic area of *Metasequoia*, drawn from data provided by PROF. WAN-CHUN CHENG

This *Metasequoia* case is by no means the only one where living species of Chinese plants have generic names which were originally based on fossil forms. In the Walnut family (Juglandaceae) two cases occur to me. In eastern Asia one finds the very characteristic monotypic genus *Platycarya*, this name proposed in 1843. An earlier name for the same group is the palaeobotanic one *Petrophiloides* (1840). Actually in 1933 MESSRS. REID and CHANDLER in their large volume devoted to a description of the London clay flora, i.e., the fossil plants found in the clay deposits which underlie the City of London, abandoned *Platycarya* as the generic name for this group and accepted the earlier *Petrophiloides* with the binomial *Petrophiloides strobilacea* (Sieb. & Zucc.) Reid & Chandl. for the living eastern Asiatic Tree. The other case is more recent. In 1941 the very striking new genus *Rhamphocarya*, with a

single species, was described from recently collected Yunnan material; but shortly after the description was published it was discovered that the earlier palaeobotanic generic name *Caryojuglans* (1935), which had been proposed to take a European fossil form, represented the same group. While in a way these two cases parallel *Metasequoia*, they are not as striking, for the Juglandaceae is, geologically speaking, a much more recent group than is the Coniferae; yet all three genera were formerly of very wide geographic distribution in the North Temperate Zone although the three living representatives, one in each genus, are now of distinctly restricted ranges in eastern Asia.

I am able to reproduce the plates, figures 86 and 87, through the courtesy of DR. H. H. HU, one showing the type tree of the species, while the other the botanical characters. DR. RALPH W. CHANEY of the University of California kindly checked the geologic and paleobotanic aspects of this short paper.

Editor's Note.—The above paper first appeared in *Arnoldia*, Vol. 8, No. 1, and we are greatly indebted to PROFESSOR MERRILL for his permission to reprint this together with some additional matter. Seed of this *Metasequoia* has germinated freely at Wisley and in other gardens in this country.

THE SACRED LOTUS—*Nelumbo nucifera*

George Sherriff and George Taylor

MUCH of the exquisite beauty of the mountain-girt vale of Kashmir in the neighbourhood of Srinagar derives from the lovely lakes and swampy lagoons which abound in this Himalayan valley. The great natural beauty has, to some extent, been enhanced by the Moghul emperors who, some centuries ago, constructed the famed terraced gardens of Shalimar and others, where by skilful use of water-channels, falls and fountains and the planting of magnificent avenues of trees they have left a noble legacy to posterity.

In the lakes there is an abundance of life and a luxuriant plant growth in which the sacred Lotus, of ageless significance to the Hindus and Buddhists, is a notable feature and one which attracts multitudes to the lakes at the time of flowering.

Nelumbo nucifera is a widespread species in the Tropics of south-eastern Asia and Australia, but it extends beyond the Tropics northwards to Kashmir, where it reaches its altitudinal limit, and westwards to Persia. The accompanying plate shows the plant growing in the neighbourhood of Srinagar at about 5,300 feet (Fig. 72). It grows along the edges of the lakes, often in association with a white Water Lily, in water up to 6 feet in depth. From July to August it produces a succession of huge, fragrant, rose-pink flowers on slender stalks rising 1-2½ feet above the water level. In August the flower buds are a favourite perch of the swallow, and it is a pretty sight to see the buds swaying above the water each with a swallow resting on it.

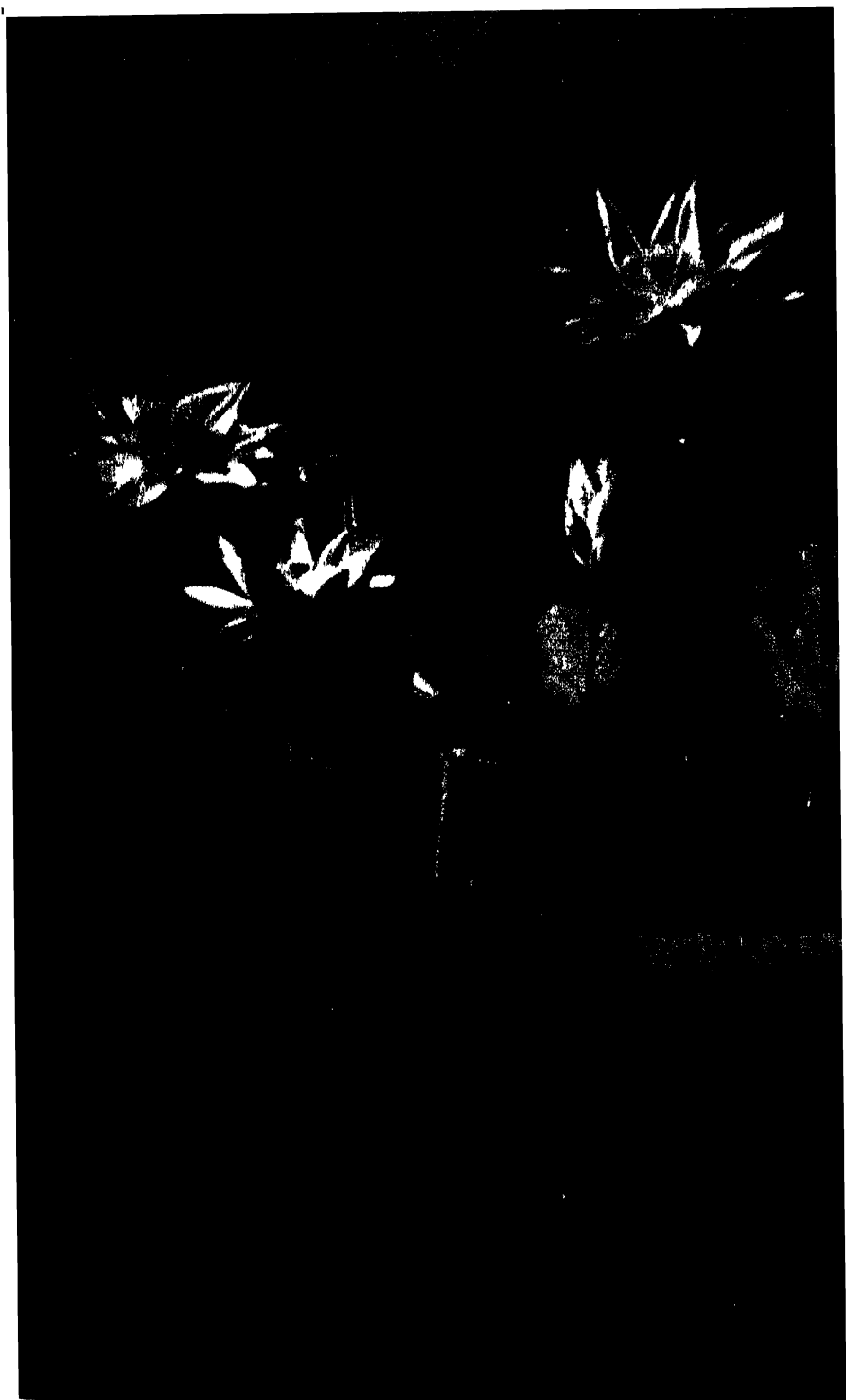


FIG. 72 —*Nelumbo nucifera* growing in a lake in the Kashmir Valley (See p. 216)



NEW AND NOTEWORTHY PLANTS

FIG. 73—*Nymphaea* 'Emily Grant Hutchings' (See p. 218)



FIG. 74 - *Magnolia mollicomata* Unfortunately this plant was killed in 1947 during the winter (See p. 207)

FIG. 75 - *Leptospermum eximium* (See p. 205)

Plate A Forster



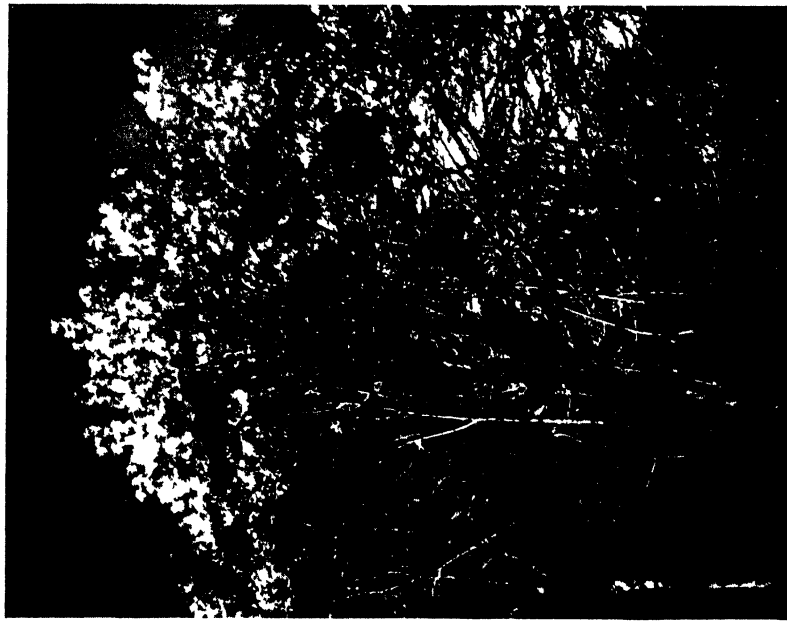
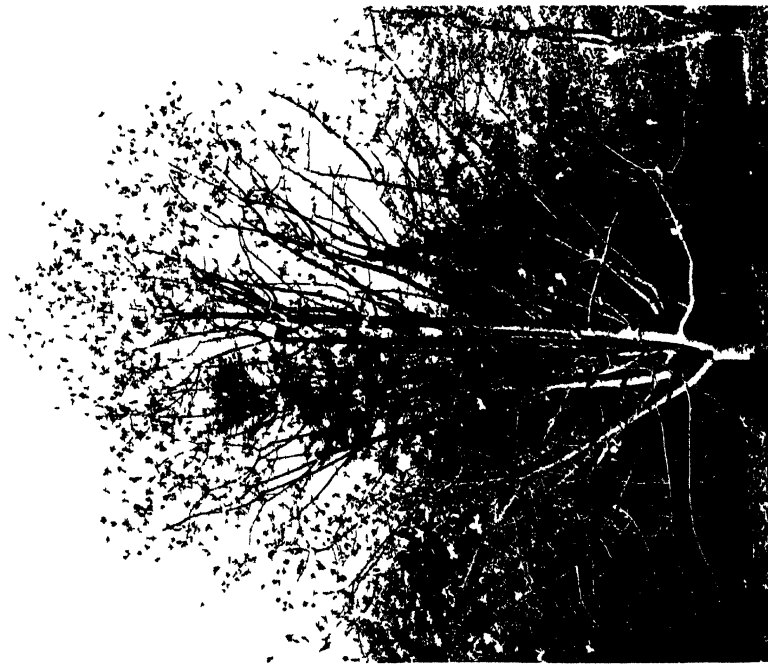


FIG 76—*Magnolia Dausoniana* at Lanarth (See p 207)



FIG 77—*Eucalyptus mansensis* with canon BOSCAWEN
(See p 203)



Photo, Country Life for A. Forster

FIG. 78—*Magnolia mollicomata* at Caerhays (See p. 208)



FIG. 79—*Magnolia Sprengeri* at Caerhays (See p. 208)



Photo Country Life for A. Forster

FIG. 80—*Camellia*—Marv. Christian—the original plant at Cuckhays. (See p. 209)



Photo A. Forster

FIG. 81—*Cornus capitata* (See p. 205)



Photo A Forster

FIG. 82 — *Rhododendron Griersonianum* at Irenzwunton (See p. 205)



Photo C. Smith Life for A. Forster

FIG. 83 — *Rhododendron Barclayi* var. 'Robert Fox' (See p. 206)

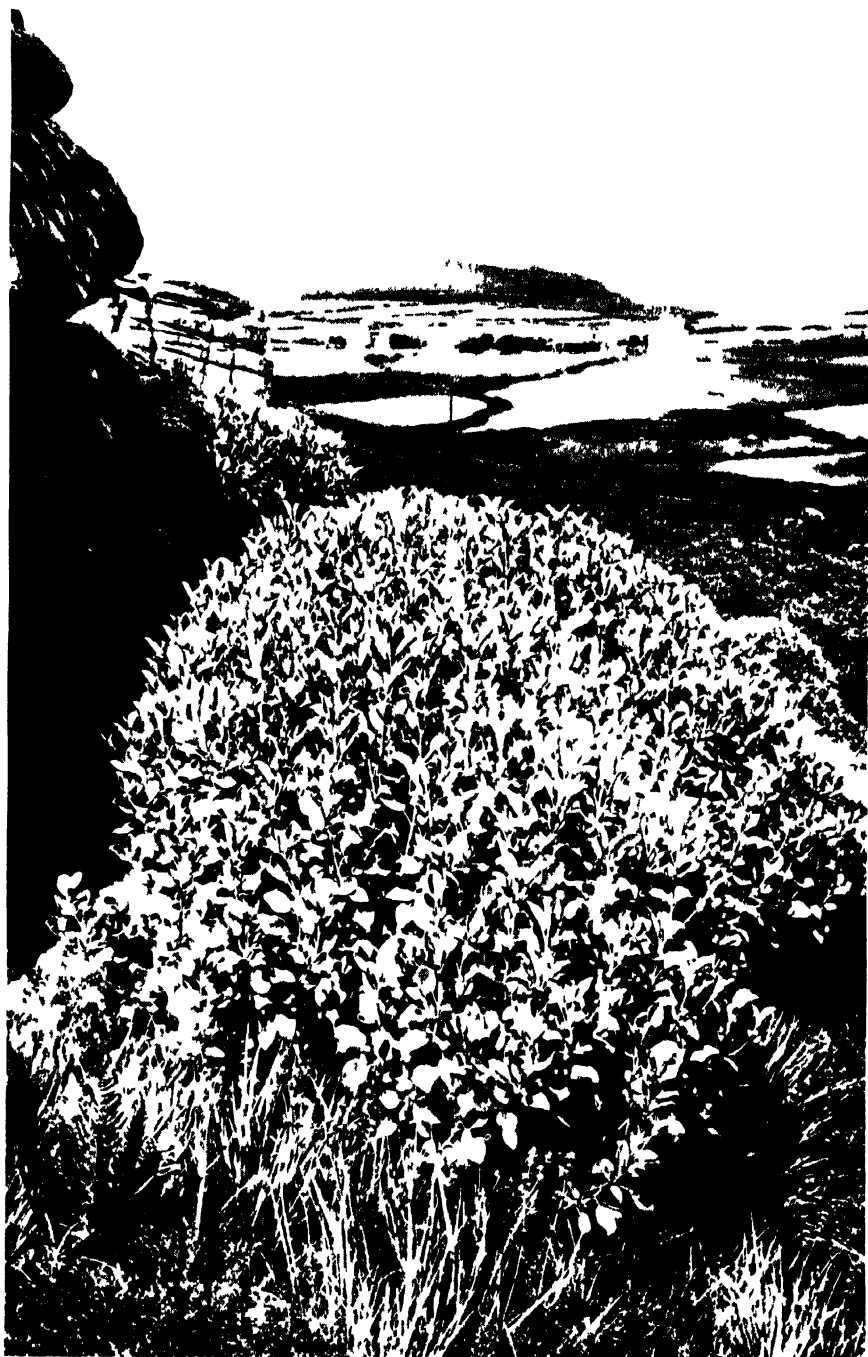


Photo A Forster

FIG 84—*Senecio rotundifolius* (See p 204)



Photo, Country Life for A. Forster

FIG 85—*Erica canaliculata* at Trengwainton (See p 205)



FIG. 86—The type tree of the new *Metasquoa* at Mou-tao-chi. This is a sacred tree as indicated by the small Todee temple in front of the tree. Todee meaning God of the Land. Courtesy of DR. H. H. HU (See p. 213)

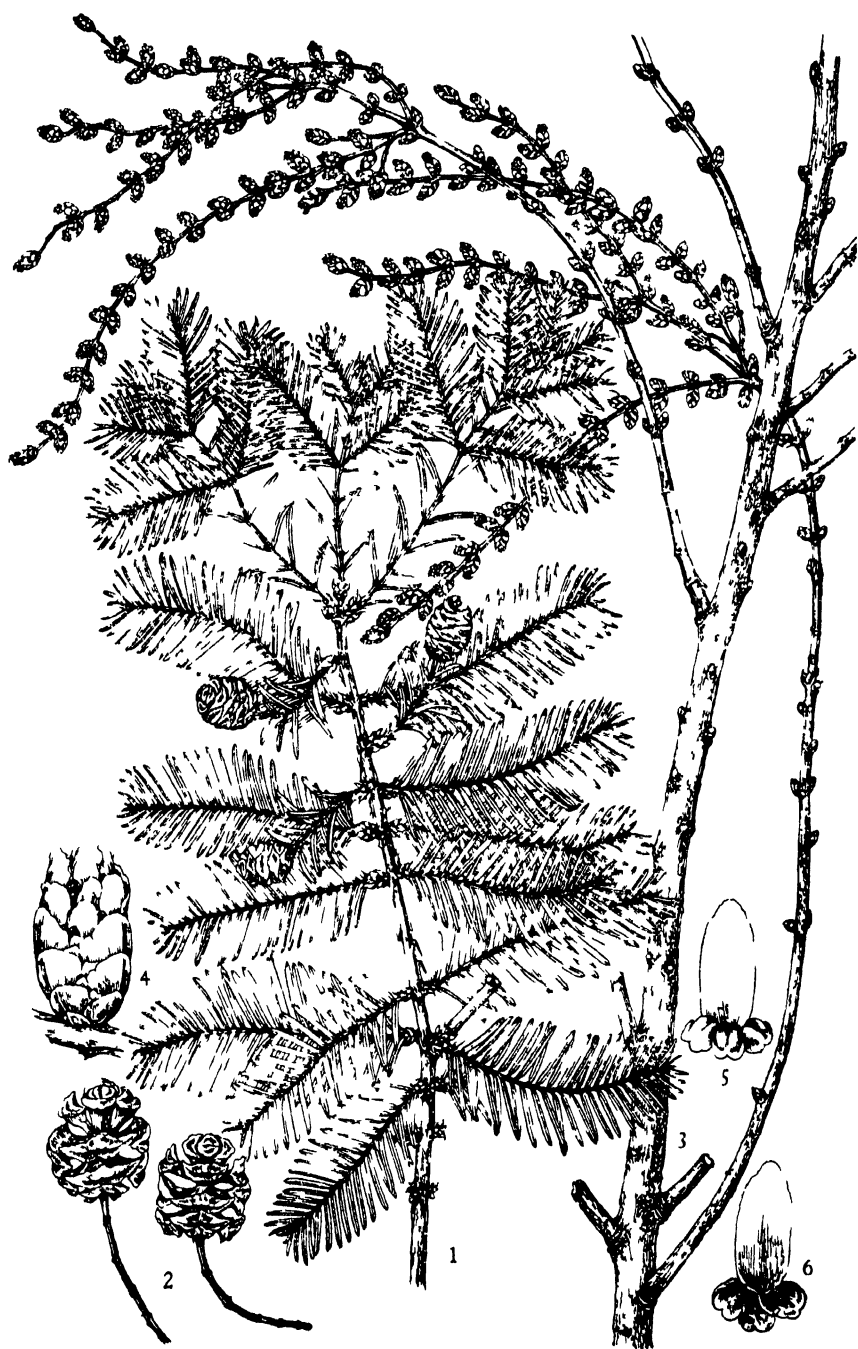


FIG. 87— *Mitasiquoia*, showing botanical characters. Courtesy of DR. H. H. HU



Colour transparency by Malby

NEW AND NOTI WORTHY PLANTS

FIG. 88—*Rhododendron* 'Choremia' I C C (See p. 218)

In Kashmir the plant is known as Pamposh and it is a valuable article of diet; the fruits are eaten either raw or cooked, while the stem, too, is comestible and is on sale in the native bazaars throughout the year. The powdered stem and an extract from the petioles and flower-stalks are reputed to have medicinal properties. In the lamps used at religious ceremonies the wicks are made from the vascular cylinder of the Lotus.

For the Hindus and Buddhists, the sacred Lotus has a deep religious significance which extends far beyond the geographical range of the plant. In Tibetan mythology it is the foundation of most charms and amulets. Throughout Tibet the invocation *Om mani padme hum*—the real meaning is obscure, but it may be freely translated as "Hail to the Jewel in the Lotus"—is carved or written, usually in beautiful characters, on boulders and even quite small stones at all the wayside shrines. The legend is commonly chiselled in enormous letters on the face of cliffs in seemingly inaccessible places. The syllables are not much used by the clergy, although they are common on the lips of the laity and the prayer is intoned by pilgrims as an unceasing accompaniment to their devotional practice of rotating prayer wheels. These wheels vary from exquisite examples of the silversmith's craft commonly surmounted by a Lotus bud, to large barrel-shaped containers housed in buildings athwart streams so that the current ensures continuous turning. Within the wheels the prayer is written many thousands of times on tightly-packed scrolls and merit accumulates with each turn. It is difficult to exaggerate the wonderful power and effect of each of the syllables of the formula on the Tibetan mind.

Fruits of *Nelumbo nucifera* have remarkable powers of dormancy and, indeed, the proved longevity of its seeds exceeds that of any known species of flowering plant. ROBERT BROWN, first Keeper of Botany in the British Museum, experimented with the fruits of *Nelumbo* and at various times between 1843 and 1855 fruits selected from the Museum collection all showed that they retained the power of germination after 150 years of confinement in a glass-topped box. A seed from the same collection was germinated by DR. J. RAMSBOTTOM, the present Keeper of Botany, in 1942, thus extending the known longevity by at least 87 years. But this record was far surpassed in 1923 when *Nelumbo* fruits dug from a prehistoric peat bed in the Pulantien Basin, South Manchuria, were shown to contain viable seeds. The fruits were estimated to have lain for nearly 400 years in an area where the plant is now "extinct."

On two occasions the plant has been figured in the *Botanical Magazine* (in 1806, tt. 903 A and B; in 1842, tt. 3916 and 3917) under the name *Nelumbium speciosum*. The species flowered at Mile-End in 1797 and was stated to have been introduced by SIR JOSEPH BANKS in 1784.

NEW AND NOTEWORTHY PLANTS

Rhododendron 'Choremia' (F.C.C. February 17th, 1948.)

THIS is a hybrid between that very best of *Rhododendron* parents, *Rh. haematodes* and a good red form of *Rh. arboreum*. The former not only helps the colour of the *arboreum* but gives to some, though not to all of the hybrids, a very fine and brilliant calyx, a feature to which I personally attach importance. After *Rh. Nobleanum* it is one of the earliest hybrids to flower.

The cross was made at Bodnant many years ago, indeed it received an Award of Merit in 1933, and evidently still holds its own among its competitors.

The back of the leaf has a pleasing soft silvery indumentum inherited from the *arboreum* parent, and the leaves grow closely together as in that species. The plant itself, however, inherits the low growing shape of *Rh. haematodes*, so that while it misses the dignity possessed by a great tree of *Rh. arboreum*, it fits in very well where a compact and low growing plant is appropriate (Fig. 88.)

ABERCONWAY

Nymphaea 'Emily Grant Hutchings'

'EMILY GRANT HUTCHINGS', one of the newest of the night-blooming water-lilies, is a splendid acquisition to the indoor pool. Belonging to the Lotos group (which includes the Indian *N. rubra*), it has very large cup-shaped flowers of a striking amaranth shade of red. The stamens, which contain much pollen, are darker still—until in an old flower they appear almost mahogany. Sepals and foliage have a bronzed-crimson overlay, probably attributable to *N. rubra* blood in the parentage. The plant was raised by MR. GEORGE PRING, of the Missouri Botanic Gardens, St. Louis, and named after the wife of the Secretary of Tower Grove Park in which these gardens are situated.

In this country it should be given plenty of room and grown indoors in rich soil, it needs abundant light and blooms freely—opening up in the late afternoon, and remaining full until about 9 A.M. the next morning. The tubers are started about February in a temperature round about 65°-70°, and potted on rapidly until large enough to plant in the tank. When the foliage dies off in autumn the tubers are lifted and stored in sand throughout the winter (Fig. 73).

FRANCES PERRY

A NOTE ON THE USE OF GIANT DAHLIAS IN THE GARDEN AND THEIR CULTIVATION

Stuart Ogg

I OFTEN hear people remark at the big exhibitions that they do not like the Giant or Large Decorative Dahlias, but it is a very strange thing that at the end of our order season, it is very noticeable that these Giants are well on top. The smaller types also have a very big following, because they are more of a dual purpose flower, as they make excellent garden plants and are most suitable for house decoration.

The public always amuse me, when they inform me that they do not like the Giant Flowered Types, and my answer to them is always that if I staged an exhibit of smaller varieties alone, half of them would pass my exhibit by, and inform me that they have a far better show in their garden grown from a packet of seed.

There is no doubt about it, that the Large Flowered varieties do fill a very important place in the Dahlia world. When these large flowered varieties are grouped at the back of the border, they add a lovely foil for the smaller types in front.

I like to plant my Dahlias in an open position, not under trees where they get a certain amount of protection. The bed should have been well dug beforehand but not too heavily manured, as this causes too much rank growth. The plants should be planted out any time after the third week in May up to the end of June, at a distance of 2 feet 6 inches to 3 feet apart, and stake them immediately, but do not use too large a stake. When 6 inches to a foot in height, pinch the top out. This encourages a fine stocky plant and prevents the plant becoming top heavy. As soon as the buds appear, mulch with farmyard manure. This helps the flower and conserves the moisture. The Large flowered varieties should always be disbudded, i.e., leave the centre bud and remove the two outside, and remove the next two growths also. The flowers are then borne on long stems, well clear of the foliage and you still maintain a well-balanced plant, instead of a top-heavy one, which normally so easily gets broken off at the base by the September gales.

There will be some comment no doubt about my planting dates. Of course the earlier the Dahlias are planted the earlier they will flower, but I seem to remember reading in your JOURNAL some years back that unless a Dahlia was planted in May, it would never be any use that season. I wish to refute this argument once and for all, as my own Dahlias were not planted out until the first week in July in 1947, when I was awarded three R.H.S. Gold Medals in succession, and in 1946 the Dahlias were not planted out until mid-June and I was awarded four R.H.S. Gold Medals in succession and the Lawrence Medal for the best exhibit of the year (this being besides a Horticultural Record).

However, I would like to point out that Dahlias planted late must be well looked after. You cannot just plant them and hope for the best. They should be well hoed and well watered if you are to obtain good results.

WISLEY TRIALS, 1947

DAHLIAS AT WISLEY, 1947

Two hundred and sixty-nine varieties of Dahlias were grown in the trials at Wisley; of these, one hundred and fourteen were grown for the first time, having been selected for trial by the Joint Committee of the Royal Horticultural Society and the National Dahlia Society, the remainder being grown for future judgment or comparison, most of which had received Awards in previous years.

The Classification of the Dahlia was first devised in 1921 and appeared in the Society's JOURNAL, 47, p. 56. In 1933, it was revised to bring it into line with the new forms that had arisen and this revised classification is given in our JOURNAL, 52, p. 155. Since then, the evolution of the Dahlia has increased and the Joint Committee felt that the time had arrived to revise the classification again and to bring it up to date. This report includes this revised edition; the varieties grown in the trials have been assigned to their particular classes.

The Joint Committee examined the trials on three occasions and made their recommendations for Awards as given below. The names in brackets after the variety denote the raiser.

The National Dahlia Society did not award a Gold Medal in 1947.

CLASS I—SINGLE DAHLIAS

Single Dahlias should not exceed 4 inches in diameter and have a single outer ring of ray florets; the centre forms a disc.

CLASS Ia—SHOW SINGLES should have smooth ray florets, broad and overlapping, forming a perfectly round flower.

Perplex (raised, introduced and sent by Messrs. K. Maarse, Niterweg 32, Aalsmeer, Holland). H.C. September 18, 1947. 3 feet. Flowers $4\frac{1}{2}$ inches diameter, a very bright shade of Signal Red (H.C.C. 719); florets broad, blunt; free and erect on stiff 12- to 22-inch stems, well above the foliage.

CLASS Ib—SINGLES. In these the ray florets do not so completely overlap and the tips are separated. This class was not represented in the trial.

CLASS II—STAR DAHLIAS

Small, with two or three rows of somewhat pointed ray florets, not, or scarcely, overlapping at their more or less recurved margins, and forming a cup-shaped flower with a disc.

The following variety has been retained: **BOGNOR STAR** (Cheal), H.C. 1930.

CLASS III—ANEMONE-FLOWERED DAHLIAS

Anemone-flowered Dahlias have an outer ring of flattened ray florets surrounding a dense group of tubular florets, which are larger than the disc florets in Single Dahlias.

This class was not represented in the trial.

CLASS IV—COLLERETTE DAHLIAS

Collerette Dahlias have one or more rings of flat ray florets with a ring of small florets (the collar) approximately half the length of the ray florets.

CLASS IVa COLLERETTE SINGLE DAHLIAS have only a single row of ray florets and one "collar" with a central disc.

The following variety has been retained: **KINGSBROOK SCARLET** (Barnes).

CLASS IVb—COLLERETTE PAEONY-FLOWERED DAHLIAS have two or more rows of ray florets and "collars" with a central disc.

This class was not represented in the trial.

CLASS IV_c—COLLERETTE DECORATIVE DAHLIAS are similar but fully double.

This class was not represented in the trial.

CLASS V—PAEONY-FLOWERED DAHLIAS

Paeony-flowered Dahlias have flowers consisting of two or more rows of more or less flattened ray florets with a central disc.

CLASS V_a—LARGE PAEONY-FLOWERED DAHLIAS with flowers over 7 inches in diameter.

This class was not represented in the trial.

CLASS V_b—MEDIUM PAEONY-FLOWERED DAHLIAS with flowers between 5 and 7 inches in diameter.

This class was not represented in the trial.

CLASS V_c—SMALL PAEONY-FLOWERED DAHLIAS with flowers less than 5 inches in diameter.

Morning Glow (raised, introduced and sent by Messrs. J. Cheal & Sons, Ltd., Lowfield Nurseries, Crawley, Sussex). **H.C.** September 18, 1947. 3½ feet. Flowers 4 inches diameter, Vermilion (**H.C.C.** 18) shaded over Dutch Vermilion (**H.C.C.** 717/2), base of florets yellow; free and erect on 12 to 15 inch stalks, well above the foliage.

The following variety has been retained. **BISHOP OF LLANDAFF** (Treseder), **A.M.** 1928.

CLASS VI—FORMAL DECORATIVE DAHLIAS

Formal Decorative Dahlias have fully double flowers showing no disc. All the ray florets are regularly arranged, the margins of the florets usually slightly incurved, more or less flattened towards the tips which may be broadly pointed or rounded.

CLASS VI_a—GIANT FORMAL DECORATIVE DAHLIAS with flowers over 10 inches in diameter.

This class was not represented in the trials.

CLASS VI_b—LARGE FORMAL DECORATIVE DAHLIAS with flowers over 8 inches and not exceeding 10 inches in diameter.

Woodland's Wonder (of Australian origin, sent by Mr. Stuart Ogg, The Grove Nurseries, Swanley, Kent). **H.C.** September 18, 1947. 3½ feet. Flowers 8 to 9 inches diameter, Blood Red (**H.C.C.** 820/1), inner florets of a deeper shade; free and erect, on 9 inch stalks, above the foliage.

The following varieties have been retained. **JERSEY BEAUTY** (Thwaite), **A.M.** 1926; **R. TREAT** (Canadian origin), **A.M.** 1929.

The following variety has been deleted from the trial. **D'ARCY SAINSBURY** (Armstrong).

CLASS VI_c—MEDIUM FORMAL DECORATIVE DAHLIAS with flowers over 5 inches and not exceeding 8 inches in diameter.

Golden Leader (raised, introduced and sent by Messrs. D. Bruidegom, Baarn, Holland). **A.M.** September 18, 1947. Described **R.H.S. JOURNAL** 17, p. 116 (**H.C.** 1946).

Moonflower (raised, introduced and sent by Mr. A. T. Barnes, 13 Cardington Road, Bedford). **A.M.** September 18, 1947. 3½ feet. Flowers 5 to 6 inches diameter. Primrose Yellow (**H.C.C.** 601/1); free and erect, on 8 inch stalks, above the foliage.

Mandarin (raised, introduced and sent by Messrs. J. Stredwick & Son, Silverhill Park, St. Leonards-on-Sea). **H.C.** September 18, 1947. 4 feet. Flowers 5 to 7 inches diameter, Buttercup Yellow (**H.C.C.** 5/1) broadly edged

and suffused with Mandarin Red (H.C.C. 717/1); free and erect, on 10 to 12-inch stalks, above the foliage.

The following varieties have been retained: ERNEST HORNBY (Brown & Such); FIREFLOAT (Brown & Such), A.M. 1946; HELLY BOUDEWYN (Carlée), A.M. 1937.

The following varieties have been deleted from the trial: JOYFUL (Brown & Such); SCARLET ORB (Brown & Such); WARDEN OOM (Derudder & Tolbaert), A.M. 1944.

*CLASS VI*d—*SMALL FORMAL DECORATIVE DAHLIAS* with flowers not exceeding 5 inches in diameter.

Bourne Crimson (raised, introduced and sent by Mr. Owen Parratt, Boundstone Nursery, Farnham, Surrey). A.M. August 14, 1947. 4½ feet, of compact, bushy habit. Flowers 3½ inches diameter, Orient Red (H.C.C. 819); very free and erect, on 9- to 11-inch stalks, well above the foliage.

Cerina (raised, introduced and sent by Messrs. Brown & Such, Ltd., Maidenhead, Berks.). A.M. September 18, 1947. 4 feet. Flowers 3½ inches diameter, Turkey Red (H.C.C. 721); free and erect, on 9- to 12-inch stalks, well above the foliage.

Art (raised, introduced and sent by Messrs. J. Stredwick & Son, Silverhill Park, St. Leonards-on-Sea). H.C. August 27, 1947. 4 feet. Flowers 3½ inches diameter, Persian Rose (H.C.C. 628/1) suffused with Camellia Rose (H.C.C. 622/1), base of florets Dresden Yellow (H.C.C. 64/1); free and erect, on 8- or 9-inch stalks, well above the foliage.

Atom (raised, introduced and sent by Mr. W. W. Bunney, The Nurseries, Barcombe, Sussex). H.C. September 18, 1947. 5 feet. Flowers 2½ inches diameter, Blood Red (H.C.C. 820/2) with a gold sheen; free and erect, on 6- to 9-inch stalks, well above the foliage.

Colmar (raised, introduced and sent by Messrs. Brown & Such, Ltd., Maidenhead, Berks.). H.C. August 14, 1947. 5 feet. Flowers 3 inches diameter, deep rich crimson-purple; free and erect, on 8- to 12-inch stalks, well above the foliage.

Herlinde (introduced by Messrs. H. Carlée and sent by Messrs. J. F. Spencer & Son, Hockley, Essex). H.C. August 14, 1947. 3½ feet. Flowers 3½ inches diameter, French Rose (H.C.C. 520), inner florets of a deeper shade; free and erect, on 8- to 11-inch stalks, well above the foliage.

Jean Barnes (raised, introduced and sent by Messrs. Brown & Such, Ltd., Maidenhead, Berks.). H.C. August 14, 1947. 4½ feet. Flowers 3½ inches diameter, Cardinal Red (H.C.C. 822); free and erect, on 10- to 12-inch stalks, well above the foliage.

Killarney (raised, introduced and sent by Messrs. J. Cheal & Sons, Ltd., Lowfield Nurseries, Crawley, Sussex). H.C. August 27, 1947. 3½ feet. Flowers 3½ inches diameter, apricot shaded peach-pink; free and erect, on 10 to 12-inch stalks, well above the foliage.

Lana (raised, introduced and sent by Messrs. Brown & Such, Ltd., Maidenhead, Berks.). H.C. August 14, 1947. 5 feet. Flowers 2½ inches diameter, Phlox Purple (between H.C.C. 632/2 and 632/1); free and erect, on 8- to 10-inch stalks, well above the foliage.

Una (raised, introduced and sent by Messrs. J. Cheal & Sons, Ltd., Lowfield Nurseries, Crawley, Sussex). H.C. August 14, 1947. 4 feet. Flowers 3½ inches diameter, deep rich glowing crimson; very free and erect, on 8- to 10-inch stalks, well above the foliage.

Verity Wadsworth (raised, introduced and sent by Messrs. J. Cheal & Sons, Ltd., Lowfield Nurseries, Crawley, Sussex). H.C. August 14, 1947. 3½ feet. Flowers 3½ inches diameter, Sulphur Yellow (between H.C.C. 1/1 and 1/2); free and erect, on 10- to 12-inch strong stalks, well above the foliage.

Willy den Ouden (of Dutch origin, sent by Mr. W. Clark, V.M.H., Hesketh Park, Southport, Lancs.). H.C. August 27, 1947. $3\frac{1}{2}$ feet. Flowers 4 inches diameter, Blood Red (H.C.C. 820/1), base of florets yellow; free and erect, on 8 or 9-inch stalks, above the foliage.

The following varieties have been retained: BANTAM (Brown & Such); CRIMSON FLAG (Cheal), A.M. 1921; CRUSOE (Cheal), A.M. 1933; DOUBLE CALDICOTE CASTLE (Woolman), A.M. 1942; HERON (Stredwick), H.C. 1946; JESCOCKATOO (Cooper); LILIAN HOWICK (Brown & Such).

The following varieties have been deleted from the trials: CARDINALIS (Cheal); JESTER (Stredwick); RHODA (Brown & Such); ROSAMOND (Brown & Such); WATERLILY (Stredwick).

CLASS VII—INFORMAL DECORATIVE DAHLIAS

Informal Decorative Dahlias have fully double flowers, showing no disc. The ray florets, which are not regularly arranged, are broad, scarcely revolute, more or less flat or slightly twisted and more or less pointed.

CLASS VIIa—GIANT INFORMAL DECORATIVE DAHLIAS with flowers over 10 inches in diameter.

Helen Stafford (raised, introduced and sent by Messrs. J. Stredwick & Son, Silverhill Park, St. Leonards-on-Sea). A.M. August 27, 1947. 4 feet. Flowers 11 inches diameter, white lightly suffused with Rose Pink (H.C.C. between 427/3 and 427/2); free and erect, on stiff 5-inch stalks, above the foliage.

John Busbridge (raised, introduced and sent by Messrs. J. Stredwick & Son, Silverhill Park, St. Leonards-on-Sea). H.C. August 27, 1947. 4 feet. Flowers 11 inches diameter, deep old gold suffused with orange; free and erect, on 6- to 8-inch stalks, well above the foliage.

Major C. C. Messervy (raised and introduced by Messrs. J. Stredwick & Son, and sent by Mr. A. T. Barnes, 13 Cardington Road, Bedford). H.C. August 27, 1947. $3\frac{1}{2}$ feet. Flowers 11 inches diameter, Primrose Yellow (H.C.C. 601); free and erect, on 5- to 6-inch stalks, well above the foliage.

Puritan (raised, introduced and sent by Messrs. J. Stredwick & Son, Silverhill Park, St. Leonards-on-Sea). H.C. August 27, 1947. $4\frac{1}{2}$ feet. Flowers 11 inches diameter, Ivory White; free and erect, on 6- to 12-inch stalks, well above the foliage.

Winston (raised and introduced by Messrs. J. Stredwick & Son and sent by Messrs. J. F. Spencer & Son, Hockley, Essex). H.C. August 27, 1947. $3\frac{1}{2}$ feet. Flowers 10 to 11 inches diameter, a deeper and brighter shade of Currant Red (H.C.C. 821), with a velvety surface; free and erect, on 8-inch stalks, above the foliage.

The following varieties have been retained: ANGELO ROSSI; ANNA BENEDICT; BRITAIN'S QUEEN (Stredwick); CLARA CARDER; EISENHOWER (Stredwick), A.M. 1945; KING OF SCARLETS; MONSTER (Stredwick); OCEANIC (Stredwick); PINK DAILY MAIL (Sandford), A.M. 1934; SALMON GIANT (Ballego), A.M. 1942; SHEILA DOWNEY (Stredwick), H.C. 1946.

The following varieties have been deleted from the trials: ENOCH POTTS (Stredwick), H.C. 1944; ROYAL OAK (Stredwick), A.M. 1942.

CLASS VIIb—LARGE INFORMAL DECORATIVE DAHLIAS with flowers over 8 inches and not exceeding 10 inches in diameter.

Burnet syn. Butterfly (raised, introduced and sent by Messrs. J. Stredwick & Son, Silverhill Park, St. Leonards-on-Sea). A.M. August 27, 1947. Described R.H.S. JOURNAL, 72, p. 114 (H.C. 1946).

Dorothy Tattam (raised, introduced and sent by Mr. A. T. Barnes, 13 Cardington Road, Bedford). A.M. August 27, 1947. 5 feet. Flowers 8 to 10 inches diameter, golden amber shaded salmon-pink; free and erect, on 9- to 14-inch stalks, well above the foliage.

Evelyn Ogg (raised, introduced and sent by Mr. Stuart Ogg, The Grove Nurseries, Swanley, Kent). **A.M.** August 27, 1947. $4\frac{1}{2}$ feet. Flowers 8 inches diameter, Mallow Purple (H.C.C. 630/1) with a rosy tinge; free and erect, on 18- to 24-inch stalks, well above the foliage.

Montgomery (raised and introduced by Messrs. J. Stredwick & Son, and sent by Mr. Stuart Ogg, The Grove Nurseries, Swanley, Kent). **A.M.** August 27, 1947. 4 feet. Flowers 8 or 9 inches diameter, a brighter and deeper shade of Primrose Yellow (H.C.C. 601); free and erect, on 8-inch stalks, well above the foliage.

Admiral (raised, introduced and sent by Messrs. N. J. van Oosten, Gravenhage, Holland). **H.C.** August 14, 1947. $4\frac{1}{2}$ feet. Flowers 8 to $9\frac{1}{2}$ inches diameter, Apricot (H.C.C. 609/1), base of florets Aureolin (H.C.C. 3/1); free and erect on 12- to 22-inch stalks, well above the foliage.

Gladiator (raised and introduced by Messrs. D. Bruidegom and sent by Messrs. J. F. Spencer & Son, Hockley, Essex). **H.C.** August 27, 1947. $4\frac{1}{2}$ feet. Flowers $8\frac{1}{2}$ inches diameter, Capsicum Red (H.C.C. 715/2); free and erect, on 6- to 8-inch stalks, above the foliage.

Golden Dawn (raised by Mr. Maxwell, introduced by Mr. A. Lovegrove and sent by Mr. Stuart Ogg, The Grove Nurseries, Swanley, Kent). **H.C.** August 14, 1947. $4\frac{1}{2}$ feet. Flowers $8\frac{1}{2}$ inches diameter, amber heavily suffused with reddish-bronze; free and erect, on 12-inch stalks, well above the foliage.

Justinius Kerner (raised by Mr. V. Berger and sent by Messrs. J. F. Spencer & Son, Hockley, Essex). **H.C.** August 27, 1947. $5\frac{1}{2}$ feet. Flowers 8 to 9 inches diameter, Currant Red (H.C.C. 821/1) changing white at tips of the florets; free and erect, on 8 to 10-inch stalks, well above the foliage.

Marion Tate (raised, introduced and sent by Messrs. J. Stredwick & Son, Silverhill Park, St. Leonards-on-Sea). **H.C.** August 27, 1947. 4 feet. Flowers $8\frac{1}{2}$ inches diameter, Roseine Pink (between H.C.C. 629/1 and 629/2) on Aureolin ground (H.C.C. 3/2); free and erect, on 6- to 12-inch stalks, well above the foliage.

Midnight (raised, introduced and sent by Messrs. J. Stredwick & Son, Silverhill Park, St. Leonards-on-Sea). **H.C.** September 18, 1947. $4\frac{1}{2}$ feet. Flowers 9 inches diameter, Indian Lake (H.C.C. 826); free and erect, on 18-inch stalks, above the foliage.

Tyne (raised, introduced and sent by Messrs. Brown & Such, Ltd., Maidenhead, Berks.) **H.C.** August 14, 1947. 4 feet. Flowers $8\frac{1}{2}$ inches diameter, a deeper and brighter shade of Rose Red (H.C.C. 724); free and erect, on 6- to 9-inch stalks, well above the foliage.

The following varieties have been retained: BEACON (Stredwick), **A.M.** 1945; CEASE FIRE (Stredwick); CHARLOTTE COLLINS; CHAS. L. MASTICK (Mastick), **H.C.** 1938; COL. W. M. OGG (Ogg); EDITH COTTRELL (Brown & Such), **A.M.** 1945; EILEEN QUINNELL (Stredwick); FRANK SERPA; JESSE CHRISTIAN (Stredwick), **A.M.** 1945; NEW GLORY; SEASHELL (Stredwick).

The following varieties have been deleted from the trials: AUDREY PHILLIPS; DELICACY (Stredwick); FESTIVE (Stredwick); LILA TRIOMF (de Ruyter); MACKENSIE (Stredwick); RUBESTONE (Brown & Such), **H.C.** 1944; T. C. ALLISON; ZANTIVE.

CLASS VIIc—MEDIUM INFORMAL DECORATIVE DAHLIAS with flowers over 5 inches and not exceeding 8 inches in diameter.

Deuil du Roi Albert (raised by Mr. R. Troquoy and sent by Messrs. Carter Page & Co., Ltd., 52 London Wall, London, E.C.2). **H.C.** August 27, 1947. $3\frac{1}{2}$ feet. Flowers 5 inches diameter, Garnet Lake (H.C.C. 828), tips of florets white; free end erect, on 6- to 12-inch stalks, well above the foliage.

Gallant (raised, introduced and sent by Messrs. Brown & Such, Ltd., Maidenhead, Berks.) **H.C.** August 14, 1947. $3\frac{1}{2}$ feet. Flowers $6\frac{1}{2}$ inches diameter, deep rich glowing crimson; free and erect, on 6- to 9-inch stalks, well above the foliage.

Sheila Mappin (raised, introduced and sent by Messrs. J. Stredwick & Son, Silverhill Park, St. Leonards-on-Sea). H.C. August 27, 1947. $4\frac{1}{2}$ feet. Flowers 7 to 8 inches diameter, ivory white, inner florets very faintly flushed Lilac; free and erect, on 6- to 9-inch stalks, well above the foliage.

Tone (raised by Hiroshi G. Endow and sent by Messrs. J. F. Spencer & Son, Hockley, Essex). H.C. August 27, 1947. $4\frac{1}{2}$ feet. Flowers $5\frac{1}{2}$ inches diameter, pale apricot-orange shading to yellow at the base of the florets; free and erect, on 6- to 10-inch stalks, well above the foliage.

The following varieties have been retained: BARRY COTTER (Brown & Such); BLAZE (Stredwick); BRENTWOOD SCARLET (West), A.M. 1934; CRAIGPARK GEM (Grier), A.M. 1946; DIAMANT (van Oosten), H.C. 1946; MAYFAIR (van Oosten), A.M. 1946; MONEYS-WORTH (Brown & Such), H.C. 1945; MURDOCH (Barwise), A.M. 1945; O. J. PRINCE (Stredwick); VANITY FAIR (Fulkes), H.C. 1941; WALCOT BRONZE (Goble).

The following varieties have been deleted from the trial: ASTARTE (Bruidgom), H.C. 1939; KIWI; LYRICK (Ballego); YSELMEER (Carlée).

CLASS VIII — **SMALL INFORMAL DECORATIVE DAHLIAS** with flowers not exceeding 5 inches in diameter.

Demure (raised, introduced and sent by Mr. A. T. Barnes, 13 Cardington Road, Bedford). H.C. August 27, 1947. $3\frac{3}{4}$ feet. Flowers $4\frac{1}{2}$ inches diameter, Persian Rose (H.C.C. 628/2), inner florets paler; free and erect, on 6- to 8-inch stalks, well above the foliage.

Kate Bowers (raised, introduced and sent by Messrs. Brown & Such, Ltd., Maidenhead, Berks.). H.C. August 27, 1947. 4 feet. Flowers 4 inches diameter, Roseine Purple (between H.C.C. 629/2 and 629/3); free and erect, on 9-inch stalks strong, well above the foliage.

Roalec (raised, introduced and sent by Mr. W. W. Bunney), The Nurseries, Barcombe, Sussex). H.C. August 27, 1947. 5 feet. Flowers $3\frac{1}{2}$ inches diameter, Neyron Rose (H.C.C. 623/1) shading to chrome yellow at the base of the florets; free and erect, on 10-inch strong stalks, well above the foliage.

Rosalind Barnes (raised and introduced by Mr. A. T. Barnes and sent by Messrs. H. Woolman, Shirley, nr. Birmingham). H.C. August 14, 1947. $3\frac{1}{2}$ feet. Flowers 4 inches diameter, base of florets Empire Yellow (H.C.C. 603) tipped and edged Rose Madder (H.C.C. 23); free and erect, on 10- to 12-inch stalks, above the foliage.

The following varieties have been retained: AMBERLEY (Barnes); BRIGHTNESS (Stredwick), A.M. 1946; DERMONT (Brown & Such), A.M. 1943; ELSIE CRELLIN (Rutter), A.M. 1943; FORTUNE (Barwise), A.M. 1938; HURSTWOOD (Barwise), H.C. 1940; MARJOLEYN (Ballego), H.C. 1946; PEACH GLOW (Barwise), H.C. 1946; SELBOURNE (Stredwick), A.M. 1932; TOWNELEY FAIRY (Barwise), H.C. 1944; WINIFRED (Barwise), A.M. 1928; WINSOME (Barwise), A.M. 1942.

The following varieties have been deleted from the trial: CATHERINE SHEPPARD (Sheppard); CLARA (Stredwick); CORPORAL (Stredwick); FUZEE (Stredwick); LUSTRE (Stredwick), H.C. 1945; PERI (Stredwick); SPRITE (Brown & Such); SUNBURN (Brown & Such); WILD ROSE (Barnes).

CLASS VIII—DOUBLE SHOW DAHLIAS

Double Show Dahlias have fully double flowers, over 3 inches in diameter, almost globular, with central florets like the outer but smaller; florets with margins incurved, tubular, short and blunt at the mouth.

The following variety has been retained: GRANDEE (Stredwick).

CLASS IX—POMPON DAHLIAS

Pompon Dahlias have flowers like those of Double Show Dahlias, but smaller.

CLASS IXa—**LARGE POMPON DAHLIAS**, with flowers over 2 inches and not exceeding 3 inches in diameter.

The following varieties have been deleted from the trial: ANNE LISTER (Lister); HEIDE JESCOT (Cooper); MODETTE (Brown & Such); PIGEON (Stredwick).

CLASS IXb—SMALL POMPON DAHLIAS, with flowers not exceeding 2 inches in diameter.

Snow Girl (raised, introduced and sent by Messrs. J. Stredwick & Son, Silverhill Park, St. Leonards-on-Sea). **A.M.** August 27, 1947. 3½ feet. Flowers 2 inches diameter, ivory-white; free and erect, on 5- to 8-inch stalks, well above the foliage.

Burwood (raised by Mrs. Britain and sent by Messrs. J. F. Spencer & Son, Hockley, Essex). **H.C.** August 27, 1947. 4 feet. Flowers 1½ inch diameter, Empire Yellow (**H.C.C.** 603), margins of florets faintly edged scarlet; free and erect, on strong 5- to 9-inch stalks, well above the foliage.

Percy (raised, introduced and sent by Messrs. J. Stredwick & Son, Silverhill Park, St. Leonards-on-Sea). **H.C.** August 27, 1947. 4 feet. Flowers 1½ to 1¾ inch diameter, tips and margins of florets Blood Red (**H.C.C.** 820), remainder Aureolin (**H.C.C.** 3/1); free and erect, on 5- to 6-inch stalks, well above the foliage.

The following varieties have been retained: **APIARY** (Brown & Such), **H.C.** 1946; **CENSOR**; **ELLEGY** (Stredwick), **H.C.** 1946; **GLEAM** (Parratt); **GLOW** (Cheal), **A.M.** 1923; **JILL** (Brown & Such), **H.C.** 1945; **LEO** (Brown & Such), **A.M.** 1946; **LITTLE EDITH**, **H.C.** 1936; **MASTER MICHAEL** (Austin), **A.M.** 1933; **MRS. J. TELFER** (Britain), **PEACH GEM** (Barwise), **A.M.** 1942; **VICKI** (Brown & Such), **H.C.** 1946; **YELLOW HAMMER**, **A.M.** 1938.

The following varieties have been deleted from the trial: **PUNCH** (Stredwick); **UNIT** (Stredwick).

CLASS X—CACTUS DAHLIAS

Cactus Dahlias have flowers fully double with the margins of the florets revolute for not less than three-quarters of their length.

CLASS Xa—LARGE CACTUS DAHLIAS have flowers over 8 inches in diameter.

Richard Crooks (sent by Messrs. Carter Page & Co., Ltd., 52 London Wall, London, E.C. 2). **H.C.** August 27, 1947. 4 feet. Flowers 8½ inches diameter, Signal Red (**H.C.C.** 719/1); free and erect, on strong, 8- to 14-inch stalks, well above the foliage.

The following varieties have been retained: **CLYDE REEVES** (Barnes); **CRIMSON BEAUTY** (Stredwick).

CLASS Xb—MEDIUM CACTUS DAHLIAS have flowers over 5 inches and not exceeding 8 inches in diameter.

Barbara Brown (raised, introduced and sent by Messrs. Brown & Such, Ltd., Maidenhead, Berks.). **H.C.** August 14, 1947. 4 feet. Flowers 6½ to 7 inches diameter, Neyron Rose (between **H.C.C.** 623 and 623/1) overlaid with yellow at the base of the florets; free and erect, on 8- to 14-inch stalks, above the foliage.

The following varieties have been retained: **DOLLY VARDEN** (Stredwick); **DOMINANT** (Bruidegom), **H.C.** 1940; **LEIDEN'S SULFER** (Ballego), **H.C.** 1946; **MASCOTTE** (Bruidegom), **A.M.** 1937; **SMOKEY** (Brown & Such); **VICTORY DAY** (Bruidegom).

The following variety has been deleted from the trial: **CHRYSANTHEFLORA**.

CLASS Xc—SMALL CACTUS DAHLIAS have flowers not exceeding 5 inches in diameter.

The following variety has been deleted from the trial: **MAUVEEN**.

CLASS XI—SEMI-CACTUS DAHLIAS

Semi-Cactus Dahlias have fully double flowers with florets broad at the base and margins revolute or twisted for less than three-quarters of their length.

CLASS XIa—GIANT SEMI-CACTUS DAHLIAS have flowers over 9 inches in diameter.

The following varieties have been retained: **IMMENSE** (Stredwick); **VOLKAERT'S CHAMPION**.

CLASS XIb—LARGE SEMI-CACTUS DAHLIAS have flowers over 7 inches in diameter and not exceeding 9 inches in diameter.

Scarlet Leader (raised and introduced by Messrs. D. Bruidegom and sent by Messrs. J. Cheal & Sons, Ltd., Lowfield Nurseries, Crawley, Sussex). **A.M.** August 27, 1947. $3\frac{1}{2}$ feet. Flowers $7\frac{1}{2}$ inches diameter, Dutch Vermilion (H.C.C. 717), inner florets Signal Red (H.C.C. 719); free and erect, on 6- to 9-inch stalks, well above the foliage.

Searchlight (raised, introduced and sent by Messrs. J. Stredwick & Son, Silverhill Park, St. Leonards-on-Sea). **A.M.** August 27, 1947. 6 feet. Flowers $7\frac{1}{2}$ inches diameter, Primrose Yellow (H.C.C. 601/1); free and erect, on 24-inch stalks, above the foliage.

Bettabracht (raised, introduced and sent by Messrs. Brown & Such, Ltd., Maidenhead, Berks.). **H.C.** August 14, 1947. $4\frac{1}{2}$ feet. Flowers 8 inches diameter, Primrose Yellow (H.C.C. 601/3), inner petals of a deeper shade; free and erect, on 8 to 14-inch stalks, above the foliage.

Nirwana (raised by Mr. Czernicki Carlée, introduced and sent by Messrs. H. Carlée, Ltd., Haarlem, Holland). **H.C.** August 14, 1947. 4 feet. Flowers 8 inches diameter, Amber Yellow (H.C.C. 505) suffused with Peach (H.C.C. 512); free and erect, on 8- to 14-inch stalks, above the foliage.

The following varieties have been retained: **BEVRYDING** (Carlée); **BOLDNESS** (Brown & Such), **A.M.** 1945; **CONQUEROR** (Carlée); **GOLDEN WEDDING** (Brown & Such); **MISS F. SMITH** (Stredwick).

The following varieties have been deleted from the trial: **LOCKENHOPF**; **VERBENA**.

CLASS XIc—MEDIUM SEMI-CACTUS DAHLIAS have flowers over 5 inches and not exceeding 7 inches in diameter.

Golly (raised, introduced and sent by Messrs. Alfons van Dijck & Son, Ramsel, Belgium). **A.M.** August 14, 1947. $3\frac{1}{2}$ feet. Flowers 5 inches diameter, Primrose Yellow (H.C.C. 601/2); free and erect, on 18-inch stalks, well above the foliage.

Morio (raised, introduced and sent by Messrs. Alfons van Dijck & Son, Ramsel, Belgium). **A.M.** August 27, 1947. 3 feet. Flowers $5\frac{1}{2}$ inches diameter, at tips of the florets Dresden Yellow (H.C.C. 64/3) deeper at the base; free and erect, on 10- to 12-inch stalks, well above the foliage.

Sweetbriar (raised, introduced and sent by Messrs. J. Stredwick & Son and sent by Messrs. J. F. Spencer & Son, Hockley, Essex). **A.M.** August 27, 1947. 4 feet. Flowers $5\frac{1}{2}$ inches diameter, pale peach-pink on creamy-yellow, inner florets Primrose Yellow (H.C.C. 601/1); free and erect, on 6- or 7-inch stalks, well above the foliage.

Tritoma (raised, introduced and sent by Messrs. J. Stredwick & Son, Silverhill Park, St. Leonards-on-Sea). **A.M.** August 27, 1947. $4\frac{1}{2}$ feet. Flowers $6\frac{1}{2}$ inches diameter, Scarlet (H.C.C. 19); free and erect, on 10- to 12-inch stalks, above the foliage.

Velva (raised, introduced and sent by Messrs. Brown & Such Ltd., Maidenhead, Berks.) **A.M.** September 18, 1947. 4 feet. Flowers $6\frac{1}{2}$ to 7 inches diameter, Ruby Red (H.C.C. 822/3) with a velvety sheen; free and erect on 4- to 8-inch stalks, well above the foliage.

Aureool (raised, introduced and sent by Messrs. D. Bruidegom, Baarn, Holland). **H.C.** August 27, 1947. $3\frac{1}{2}$ feet. Flowers 6 inches diameter, Primrose Yellow (between H.C.C. 601/1 and 601/2); free and erect, on 6- to 12-inch stiff stalks, well above the foliage.

Bravour (raised, introduced and sent by Messrs. D. Bruidegom, Baarn, Holland). H.C. August 14, 1947. 4 feet. Flowers 6 to 7 inches diameter, Indian Orange (H.C.C. 713/1) overlaid on Capsicum Red (H.C.C. 715/2); free and erect, on 8- to 12-inch stalks, well above the foliage.

Charles Andrews (raised, introduced and sent by Messrs. Brown & Such Ltd., Maidenhead, Berks.). H.C. August 27, 1947. 4 feet. Flowers 6 inches diameter, Currant Red (H.C.C. 821/1) with a velvety texture; free and erect, on 6- to 14-inch stalks, above the foliage.

George Lawrence (raised, introduced and sent by Messrs. Brown & Such Ltd., Maidenhead, Berks.). H.C. August 27, 1947. 4½ feet. Flowers 7 inches diameter, deep peach-pink suffused with orange; free and erect, on 14 inch stalks, well above the foliage.

Norman (raised, introduced and sent by Messrs. J. Stredwick & Son, Silverhill Park, St. Leonards-on-Sea). H.C. August 14, 1947. 4½ feet. Flowers 5 to 6 inches diameter, Rose Red (H.C.C. 724); free and erect, on 15- to 20-inch stalks, above the foliage.

Perran (raised, introduced and sent by Messrs. Brown & Such Ltd., Maidenhead, Berks.). H.C. August 27, 1947. 4½ feet. Flowers 5½ inches diameter, Cherry (H.C.C. 722); free and erect, on 15-inch stalks, well above the foliage.

Stately (raised, introduced and sent by Mr. J. F. Barwise, Towneley Nursery, Burnley, Lancs.). H.C. August 27, 1947. 3 feet. Flowers 5½ inches diameter, Carrot Red (H.C.C. 612) overlaid with Indian Yellow (H.C.C. 6/1); free and erect, on 15-inch stalks, above the foliage.

Valour (raised, introduced and sent by Messrs. J. Stredwick & Son, Silverhill Park, St. Leonards-on-Sea). H.C. August 27, 1947. 4 feet. Flowers 6 inches diameter, Dianthus Purple (H.C.C. 730); free and erect, on 10-inch stalks, above the foliage.

Yellow Special (raised, introduced and sent by Messrs. D. Bruidegom, Baarn, Holland). H.C. August 27, 1947. 4 feet. Flowers 6 inches diameter, Sulphur Yellow (H.C.C. 1/1); very free and erect, on 10- to 14-inch stalks, well above the foliage.

The following varieties have been retained: DIGNITY (Barwise), H.C. 1945; DOROTHEA'S ORANGE (Derudder & Toebaert), H.C. 1946; FORTUNE'S GIFT (Barwise), A.M. 1942; Jo BLAAUW (Ballego), H.C. 1946; MITHRA (Bruidegom); NOVIET (Bruidegom); PEACH QUEEN (Barwise), H.C. 1946; RESTFUL (Brown & Such); ST. HELEN (Stredwick); SUNBEAM (Barwise); SWEETNESS (Brown & Such), H.C. 1946; TORCH (Barwise), H.C. 1946; TRITONE (Brown & Such) H.C. 1946.

The following varieties have been deleted from the trial: DAILY DELIGHT (Brown & Such); ELIZABETH BROWN (Brown & Such); ISELBERG; REMEMBRANCE; RUSSET (Brown & Such).

CLASS XI_d—SMALL SEMI-CACTUS DAHLIAS have flowers not exceeding 5 inches in diameter.

Adur (raised, introduced and sent by Messrs. Brown & Such Ltd., Maidenhead, Berks.). A.M. August 27, 1947. 3½ feet. Flowers 4½ inches diameter, white; very free and erect, on 6- to 9-inch stalks, well above the foliage.

Little Fawn (raised, introduced and sent by Messrs. Brown & Such Ltd., Maidenhead, Berks.). A.M. August 27, 1947. 4 feet. Flowers 4½ inches diameter, pale peach-pink on pale apricot; very free and erect, on 8-inch stalks, well above the foliage.

Andries Orange As (raised and introduced by Mr. R. Andries and sent by Messrs. J. F. Spencer & Son, Hockley, Essex). H.C. August 27, 1947. 3½ feet. Flowers 4½ inches diameter, Orange (between H.C.C. 12 and 12/1); free and erect, on 8-inch stalks, well above the foliage.

Firethorn (raised, introduced and sent by Mr. A. T. Barnes, 13 Cardington Road, Bedford). H.C. August 14, 1947. 4½ feet. Flowers 4½ inches diameter, Orient Red (H.C.C. 819) with a bright velvety sheen; free and erect, on 6- to 9-inch stalks, well above the foliage.

Mauveron (raised, introduced and sent by Messrs. Brown & Such Ltd., Maidenhead, Berks.). H.C. August 27, 1947. 3½ feet. Flowers 5 inches diameter, Roseine Purple (H.C.C. 629/1); free and erect, on 6-inch stalks, well above the foliage.

The following varieties have been retained: ANIMATO (Bruidgom); BERYL (Stredwick), H.C. 1946; BESSIE (Barwise), H.C. 1941; CREE (Brown & Such), H.C. 1943; DAINY ROSE (Carter Page); FAIRHOLME (Barwise), H.C. 1946; HONEYSUCKLE (Stredwick); KENNET (Brown & Such), A.M. 1946; MAB (Stredwick), H.C. 1946; MARKET GLORY; MARY TATTAM (Barnes); PEACEFUL (West), A.M. 1939; RENE (Barwise); SABINE (Ballego), A.M. 1946; SPORTSMAN; TOWNELEY IDEAL (Barwise).

The following varieties have been deleted from the trial: ARABESKE (Bruidgom); DOROTHEA'S SUCCESS (Derudder & Toebaert); RIVAL (Barwise); ROSE MAYLIE (Stredwick); SEVILLE (Barnes).

CLASS XII—MISCELLANEOUS DAHLIAS

Any Dahlias which do not fall into one of the foregoing Sections, *e.g.* Orchid-flowered Dahlias.

This class was not represented in the trial.

CLASS XIII—DWARF BEDDING DAHLIAS

Plants do not usually exceed 24 inches in height. The flowers may belong to any of the foregoing sections.

Brentwood Bedder (raised and introduced by the late Mr. J. T. West and sent by Mr. Stuart Ogg, The Grove Nurseries, Swanley Kent). A.M. August 14, 1947. Described R.H.S. JOURNAL, 72, p. 115 (H.C. 1946).

Constance Bolton (raised and sent by Mr. E. J. Barker, Kelmescott, London Road, Ipswich). A.M. August 27, 1947. 18 inches. Flowers 3½ inches diameter, informal decorative, Maize Yellow (H.C.C. 607), inner florets shaded orange; very free and erect, on 5- to 7-inch stalks, well above the foliage.

Mrs. Musgrave Hoyle (raised by Mr. Frank Smith, introduced and sent by Messrs. E. F. Fairbairn & Sons, Edentown Nurseries, Carlisle). A.M. August 27, 1947. Described R.H.S. JOURNAL, 72, p. 114 (H.C. 1946).

Park Beauty (of Dutch origin, sent by Mr. Stuart Ogg, The Grove Nurseries, Swanley, Kent). A.M. August 27, 1947. Described R.H.S. JOURNAL, 72, p. 115 (H.C. 1946).

Pride of Edentown (raised, introduced and sent by Messrs. E. F. Fairbairn & Sons, Edentown Nurseries, Carlisle). A.M. August 14, 1947. 2 feet. Flowers 3½ to 4 inches diameter, formal decorative. Signal Red (H.C.C. 719); very free and erect, on 6- to 10-inch stalks, well above the foliage.

Flame (sent by Messrs. J. Cheal & Sons Ltd., Lowfield Nurseries, Crawley, Sussex). H.C. August 14, 1947. 2 feet. Flowers 3½ inches diameter, formal decorative, Capiscum Red (H.C.C. 715/1); free and erect, on 6- to 10-inch stalks, well above the foliage.

Grace Afflick (sent by Messrs. Brown & Such Ltd., Maidenhead, Berks.). H.C. August 27, 1947. 22 inches. Flowers 3½ inches diameter, single, white broadly edged, Signal Red (H.C.C. 719); free and erect, on 5- to 9-inch stalks, well above the foliage.

Grappenhall (sent by Mr. Stuart Ogg, The Grove Nurseries, Swanley, Kent). H.C. August 27, 1947. 2 feet. Flowers 4½ inches diameter, single,

Carmine (between H.C.C. 21 and 21/1) overlaid golden-orange; free and erect, on 8- to 10-inch stalks, well above the foliage.

Mrs. J. Jefferies (sent by Mr. W. Austin, New Lodge, Inner Circle, Regent's Park, London, N.W. 2). H.C. August 27, 1947. 22 inches. Flowers 4 inches diameter, semi-double, Capsicum Red (H.C.C. 715/3); free and erect, on 6- to 8-inch stalks, well above the foliage.

Shirley White (raised, introduced and sent by Mr. H. Woolman, Sandy Hill Nurseries, Shirley, Birmingham). H.C. August 27, 1947. 18 inches. Flowers 4 inches diameter, single, white; free and erect, on 5 to 8 inch stalks, well above the foliage.

The following varieties have been retained: BRAYWICK CHARM (Brown & Such), H.C. 1946; BURMA (Cheal); BUSBY GEM (Toitance & Hopkins), H.C. 1946; COLTNESS GEM (Purdie), A.M. 1923; FAIRY; HILDA (Treseder); LADY AILEEN (Ardern), A.M. 1926; LITTLE MARVEL (Stredwick), A.M. 1943; MAUREEN CREIGHTON (East), A.M. 1946; MRS. WM. CLARKE (Woolman), A.M. 1929; MURILLO (Cheal), H.C. 1933; PAISLEY GEM, H.C. 1926; PINK COLTNESS, H.C. 1926; PRINCESS MARIE JOSÉ (West) A.M. 1946; SCARLET GEM (Dobbie), A.M. 1932; SHIRLEY YELLOW (Woolman), WINDERMERE (Woolman), H.C. 1946.

The following variety has been deleted from the trial: DOBBIE'S BEDDER (Dobbie).

THE EFFECT OF SOME PRE-PLANTING STORAGE TREATMENTS ON THE GROWTH OF SHALLOTS

L. G. G. Warne

(VICTORIA UNIVERSITY OF MANCHESTER)

ONE of the defects of Shallots as a garden and commercial crop is the small size of the bulbs. Any cultural or other method, provided it is practicable, that leads to an increased bulb size, especially if combined with an increased total yield, is likely to be of value. As will be seen later, the storage treatment to which Shallot bulbs are subjected before planting may exert a profound effect on bulb size and total yield.

The only previous work on this subject appears to be that of JENKIN AND MILLER,* who reported that storage of the bulbs before planting, for 15, 30 or 60 days, at 4.4° C. resulted in the production of plants that were smaller, less vigorous and went to seed more quickly than those derived from bulbs stored at ordinary temperature. The same workers state that large bulbs produced more "plants" (daughter bulbs) than smaller ones, but that a higher proportion went to seed.

EXPERIMENTAL METHOD AND RESULTS

(a) *Material.* The Shallots used in the experiments described here were of a small long-keeping type that rarely exhibited more than a trace of red colouring. Grown over six years, they have never shown any tendency to flower and may be justifiably described as a non-flowering strain, at least under the conditions obtaining here.

* *Proc. Amer. Soc. Hort. Sci.*, 1931 (1932), 28, 315-317.

(b) *Experiments* (1944-45). In September 1944, these Shallots were placed in an incubator at 30° C. used for the routine high temperature storage of Onion sets. They were stored at this temperature until March 1945, whilst others were stored at "ordinary" (laboratory) temperatures and both sets planted in the normal way. The plants from the high temperature stored bulbs were slow to come into growth, exhibited delayed bulbing and a more delayed ripening so that their harvest was delayed until September—six weeks after the harvest of the plants from the normally stored bulbs. Further, they were characterized by an abundant production of red pigment. Data for the yield of the two sets of plants are given in Table I.

TABLE I
Showing Yields of Shallots

PLANTS FROM	MEAN WEIGHT OF BULBS PRO- DUCED PER PLANT, GRMS.	MEAN NO. OF BULBS PER PLANT	AVERAGE BULB WEIGHT, GRMS.
Normally stored bulbs .	109	6.9	15.8
High temperature stored bulbs	221	10.3	21.4

Accurate determination of the number of daughter bulbs per plant was extremely difficult with the plants from the high temperature stored bulbs, as these produced many markedly asymmetrical bulbs which, on dissection, generally proved to consist of a large and one or two smaller "bulbs"—or at least swollen buds—enclosed in a common set of bulb scales. Sometimes after the normal drying of the plants after harvest, the common investing scales rubbed off so that two or three separate bulbs resulted. At other times not all the scales rubbed off. Hence in deciding "bulb number per plant" a personal factor of some magnitude is introduced. As all counts were made by the same worker, the results obtained should be comparable.

These results will not be stressed, as, although the bulbs planted were selected by eye for uniform size, the two sets planted may not have been of the same weight.

(c) *Experiments* 1945-46. The results obtained in 1945 seemed of sufficient interest to warrant further experiments, and for the 1945-46 season the following storage treatments were given:

TABLE II

2 and 3	Ordinary (laboratory) storage through the winter
6 and 7	Low Temperature (0-4° C.) " " "
8 and 9	High (30° C.) followed by Ordinary temperature
12 and 13	Low " " " "
14 and 15	Ordinary " " Low temperature

Each treatment was applied to two sets of bulbs, of medium (10.5 gm.) and small (3.12 gm.) size respectively. In referring to the treatment, the numbers in column 1 of Table II will be used, even numbers referring to the medium sized bulbs, and odd to the small ones. The results yielded seem to merit report at this stage. The storage treatments were commenced on October 1, 1945, and the first stage of the storage treatment extended to 88 days, the second stage to 71 days, giving a total of 159 days.

All lots of bulbs were weighed before and after storage, and the loss of weight during storage in each case is shown in Table III.

TABLE III

Showing Percentage loss in Weight of Shallot Bulbs during Storage.

TREATMENT	MEDIUM BULBS	SMALL BULBS
Ordinary temperature	32.3	32.9
Low temperature	9.2	8.3
High and Ordinary temperature .	37.9	35.2
Low and Ordinary „	24.9	25.8
Ordinary and Low „	24.6	25.3

No sprouting of bulbs occurred during storage, and there was no loss of bulbs owing to any storage rots. The most noticeable feature of Table III is the reduced loss of weight shown by the bulbs stored at low temperature, especially when this treatment extended over the whole storage period. Differences in loss of weight for the two sizes of bulbs are very small and inconsistent.

The bulbs were all planted out-of-doors on March 13, 1946, in a garden of medium fertility, and not believed to suffer from any mineral deficiencies.

1946 Results. All sets of plants grew satisfactorily and exhibited no mortality. The plants of treatment 8 and 9 were noticeably slower to come into growth than the others, but this difference was soon lost. Always the plants from the medium bulbs were more vigorous than those from the small ones, and by mid-April the plants of series 9, 13 and 15, although of normal height, had foliage which might best be described as "thin." By mid-June noticeable differences between the several lots in the degree of bulbing were evident. Series 8 and 12 were beginning to bulb, series 9 and 13 were slightly more forward, whilst all the other plants were in an advanced state of bulbing. Series 8, 9, 12 and 13 continued to carry vigorous green upright foliage, whilst the others began to ripen off. By July 23, 1946, series 2, 3, 6, 7, 14, and 15 were fit to harvest. Sets 8, 9, 12 and 13 at this date showed no signs of ripening, but continued to grow vigorously and were finally ready to harvest on August 26, 1946. All the plants were dried off in the laboratory, and when "air-dry," rubbed out in the usual way, and the bulbs from each plant weighed individually. The data collected from these plants are assembled in Table IV.

TABLE IV

Yield Data for Shallots Grown from Bulbs subjected to Storage Treatments.
Mean Values \pm Standard Errors

STORAGE TREATMENT	PLANTS FROM MEDIUM SIZED BULBS		
	Mean yield of bulbs per plant gm. \pm st. e.	Mean no. of bulbs per plant \pm st. e.	Average Indi- vidual bulb weight, gm.
Ordinary	82.1 \pm 12.0	7.14 \pm 0.64	11.46
Low temperature . .	85.9 \pm 8.8	7.80 \pm 0.42	11.02
High + Ordinary tem- perature	140.8 \pm 14.9	7.72 \pm 0.53	18.23
Low + Ordinary tem- perature	169.4 \pm 19.6	8.72 \pm 0.76	19.43
Ordinary + Low tem- perature	73.3 \pm 10.6	7.34 \pm 0.53	10.00
STORAGE TREATMENT	PLANTS FROM SMALL BULBS		
	Mean Yield of bulbs per plant gm. \pm st. e.	Mean no. of bulbs per plant \pm st. e.	Average Indi- vidual bulb weight, gm.
Ordinary	27.3 \pm 4.9	3.22 \pm 0.13	8.48
Low Temperature . .	45.0 \pm 6.0	3.05 \pm 0.24	14.76
High + Ordinary tem- perature	72.2 \pm 11.4	3.87 \pm 0.50	19.17
Low + Ordinary tem- perature	87.2 \pm 9.7	4.33 \pm 0.44	20.13
Ordinary + Low tem- perature	41.8 \pm 7.4	3.53 \pm 0.48	11.85

Comparing first the results from the plants from the medium and small bulbs, the former always produce the higher yield due chiefly in most cases to the greater number of bulbs per plant. The greater weight produced by the plants from medium bulbs stored at ordinary temperatures might be ascribed to the greater weight of the planted bulbs, but with all the other treatments, the production per *unit weight* of bulbs planted is greater when small bulbs are planted than when those of medium size are used. Generally, individual bulb weights do not differ appreciably in the two sets, and there is no suggestion that the small planted bulbs have given a much higher proportion of large daughter bulbs as stated by HOARE.* It must be remembered, however, that the small bulbs used in this experiment are probably much smaller than would generally be used for planting.

* *Vegetable Crops for Market*, Crosby Lockwood & Son, London, 1945, p. 101.

With both sizes of planted bulbs, certain of the storage treatments have affected the yield greatly. There is some divergence between the results for the small and medium size bulb plants. Practically, however, the results for the medium bulbs are probably of the greatest significance.

With both sets of material high temperature + ordinary storage and low temperature + ordinary storage have increased the total yield per plant—by approximately 100 per cent. for the medium bulb plants and 200 per cent. for the small bulb plants. This increase has been achieved mainly by an increase in individual bulb weight, and only slightly by an alteration in the number of bulbs produced per plant. Treatments 8 and 12, as well as 9 and 13, all caused an increased production of asymmetrical bulbs, and so it is safe to state that these treatments caused an increase in the number of buds swelling per plant, although all the buds stimulated to grow did not become enclosed in separate sets of bulb scales.

With the "small bulb" plants, the increased yield of bulbs is again due mainly to an increase in individual bulb weight, but here treatment 13 has significantly increased the number of bulbs per plant. The apparent difference between the plants from medium and small bulbs may be due to a slightly more frequent complete splitting of the "doubles" in the small bulb plants. Another noticeable feature is that, whilst treatments 7 and 15 have increased the total weight per plant, and the individual bulb weight appreciably, similar treatments (6 and 14) fail to evoke any response in the plants from the medium size bulbs. This effect is most marked with treatment 7 (continuous low temperature), and, in fact, is barely significant with treatment 15.

It is clear from these data that the growth and yield of Shallots is profoundly influenced by the pre-planting storage treatments to which the bulbs have been subjected, and that storage at high temperatures for the whole winter (1945 data) or for the first half of the winter (1946 data) results in a greatly increased yield; the increase being achieved mainly through an increase in the weight of individual bulbs.

Low temperature storage, too, is effective. Given through the winter, it increases bulb size only with "small bulb" plants. Given for the first half of the winter it is effective with both small and large bulb plants, but low temperature storage for the first half of the winter with both classes of material is more effective than low temperature treatment throughout the whole storage period.

BOOK NOTES

"Les Beaux Fruits de France." By Georges Delbard. 166 pp. Illus. Paris 1947. 2,500 francs [6 guineas].

"Les Beaux Fruits de France" pictorially displays the art of Fruit Tree raising, pruning and management as commonly done in France. In all there are 429 photographs and each one is accompanied with a few well-chosen words. 174 pictures are in Part I showing tree management and 210 in Part III depicting specimens infected and damaged with diseases and pests and control measures.

Part II is the most elaborate part and this contains coloured photographs of the most approved fruit varieties for culture in France. These coloured photographs include 12 varieties of Cherries, 5 of Strawberries, 18 of Peaches, 34 of Pears, 31 of Apples as well as a few varieties of soft fruits and nuts. The whole is a beautiful book of 164 pages of a size 14 inches by 11 inches.

The coloured photos of Cherries, Peaches, Pears, Strawberries, Grapes and Nuts reach a high standard of technical accuracy and raise the book to a foremost place amongst the pomological books of France.

The Author explains that work on the book commenced in 1943 when France was under German occupation and that he has received considerable help from a large number of people.

H. V. TAYLOR

"Lithops." By G. C. Nel. (Published by Hortors Ltd., 78 Bree Street, Cape Town.) £5 5s. (Text in English and Africaans.)

Lithops, those curious little, pebble-like plants of the South African deserts, are not difficult to grow in this country but the naming of them has not been so easy; a monograph on the genus by the Professor of Botany at Stellenbosch University will therefore be welcome. Professor Nel does not disguise the difficulties of the subject; Lithops are hard to find owing to their close resemblance to their surroundings and they grow in such inaccessible places that there are probably a number of species yet undiscovered. Moreover there is little variation in the form of the flower, which is not, therefore, of much use in identification. Each plant consists of a pair of leaves fused into a cone-shaped body and it is suggested that the form and coloration of the upper surface is a more reliable guide than the flowers. In some species this surface is opaque, in others there is a translucent "window," whilst two intermediate classes are distinguished by the author. He has drawn up a key which should be of considerable assistance, although he himself says: "the key will unfortunately not enable one to determine satisfactorily certain species and in that case use should be made of the photographs and the coloured plates."

These illustrations are excellent; there are photographs of most of the species showing them growing in their natural surroundings and every species is depicted in colour; as a rule the coloured drawings are larger than life size so that the markings can be easily seen. To identify a plant by means of the key needs experience; it should not be difficult when a good knowledge of a number of species has been obtained, but the plants vary throughout the year and under different conditions of cultivation, so that anyone who knows only a few species may find the key difficult to use satisfactorily. But the coloured plates are much easier to follow. It appears, however, that even in a single species—as recognized by Professor Nel—there are very considerable variations. That he has been able to reduce the number of specific names in use is all to the good, but one is tempted to wonder if the fifty names that he recognizes really represent distinct species. The author would hardly claim that this is the last word on a difficult subject, but anyone interested in Lithops will be grateful for this revision of the existing material and for the clear manner in which it has been presented—and especially for the beautiful illustrations.

VERA HIGGINS

"The Growing Plant." By W. Neilson-Jones. 8vo. 201 pp. with 16 half-tone illus. 36 figs. Glossary. Faber and Faber. London 1948. 16/-.

Professor Neilson-Jones has written this book to provide information to the general reader about a number of aspects of plant life that, he has found, evoke widespread interest. His selected topics are concerned with growth or the increase in size of plants, and with development or the change from vegetative growth to the flowering condition. The chapters of this book take the form of seven essays, each an entire entity but complementary to the others. They deal with plants in relation to their habitats; with plants made up of differing parts, chimaeras, in which the core of one plant may be covered by a skin of another; with hormones and some of the applications of related substances to practical horticultural problems; with flowering and its control where again there are practical applications; with plant nutrients and the minor, or trace, elements and the practical question of soilless cultivation. The other essays are concerned with the growth of plants in soil and here the importance of humus is considered, and the complexity of the biological activities of the soil organisms is stressed. The author also briefly refers to the investigations, with which he has been associated, on the part played by fungi in the mycorrhiza, or fungus roots of trees, showing the vital importance of organic matter for the formation of these roots without which many trees may not grow well. The concluding chapter deals with seeds, their formation and longevity, and questions related to pollination and fertilisation.

Throughout, the principles receive priority of treatment, the practical applications to horticulture are used as examples. Thus, the reader will not learn exactly how to produce Daffodils at Christmas, though he may appreciate the discussion on the control of time of flowering by means of manipulation of the temperatures to which bulbs are subjected. Nor are details always given of the concentrations at which chemicals are used, to produce seedless tomatoes for example. By careful selection of a few references the reader is shown where such information may be found.

As the style of writing is fluent, uninterrupted by references, and as the text is illustrated by plates and figures, of which No. 8 is perhaps not so well reproduced as the others from the point of view of clarity, and as a glossary of technical terms has been provided, the general reader has a very pleasant task before him.

An error on p. 19, lines 15 and 16, has escaped detection in proof-reading.

M. A. H. TINCKER

"Gardening for Pleasure." By George E. Whitehead. (Adam & Charles Black.) 8vo. 285 pp. Illustrated. 10s. 6d.

Mr. George Whitehead has written a popular book on gardening which contains a good measure of valuable advice for the beginner, and which should inspire the reader with the enthusiasm which obviously inspires the author himself. It is divided into twelve chapters on different aspects of gardening, such as "Bedding Plants," "Rose Gardening" and "Hedges and Edges," and ends with a postscript on horticultural literature; it is illustrated with attractive black-and-white photographs and a number of diagrams. Mr. Whitehead has clearly no intention of making his book a scientific or technical treatise—in fact he sometimes goes out of his way to wag a reproving finger at the over-scientific gardener—and it is perhaps unfair to criticize him for lack of accuracy in botanical matters; but there are a number of really bad errors which it is hoped will be corrected in a later edition. For example, the word "specie" is used throughout as the singular of "species," there is repeated confusion between genus, family and order, and it is surely carrying contempt for botanical nomenclature too far to write "these species have crank names like *Rhododendron cinnabarinum Roylei* and *Rhododendron trichocladum*."

"Dahlias." By S. J. Spencer. 88 pp. Illus. Spencer & Co., Hockley. 5s.

This deals very fully with the History and Botany of the Dahlia and traces the development of the flower to the present day, which has necessitated the revised classification of the different forms that now exist. Much useful information is to be found among its pages for the amateur and the exhibitor.

The Large and Giant Flowered varieties have, as Mr. Spencer says, "a limited use in the ordinary small garden, unless the grower is a keen exhibitor." This is sound advice to the novice; perhaps the ardent grower will not agree.

The chapters on Planning, Cultivation, Choosing and Preparing the Site, Planting and Disbudding are sound and practicable, besides containing much useful information. The Storing of the Tubers, often a stumbling block with the small grower, is dealt with both from the commercial as well as the private point of view.

The author is justified in saying that, apart from virus, Dahlias are remarkably free from serious diseases, and it would have been better to have headed his chapter "Virus Diseases of the Dahlia." There are other diseases which at times do serious damage and deserve at least a brief description. The descriptions and photographs of the virus diseases are good but under "control," no mention is made of the disinfection of the knife when taking cuttings, to avoid the spread of these diseases. No mention of each photograph by its number is made in the text; if done, this would have been a great help to the reader. So many photographs depicting diseases tend to baffle the reader, particularly as no information is given about them. Despite these criticisms we feel that if the author can awaken more interest in the necessity for keeping Dahlia stocks clean, he will have rendered a service to horticulture in general.

In the chapter on "Insects and other Pests" the author's advice is sound and practicable, but he is not fully up to date. For example, various proprietary brands of synthetic spreaders are now substituted for soap. "Meta" is no longer sold under this name, but should read Metaldehyde. For the control of leather jackets and cutworms, no mention is made of Paris Green and bran bait, and why classify the Capsid Bug as a biting insect? Crown Gall is *not* due to a mite but to a bacterium, *Corynebacterium fascians*. It would have been better to include the paragraph on Bacteria with Diseases. The Hawk or Drone flies are *not* gad-flies, while the correct spelling of H.E.T.P. is Hexaethyl tetraphosphate and not as given in the text. Chrysanthemum Eelworm is the species referred to as attacking the Dahlia on occasion and is not a reptile but a nematode. We should very much like to see these corrections incorporated in any future edition.

F. C. BROWN

EDITOR'S NOTE

¶ The Editor regrets that the Society is unable to supply any of the books reviewed other than those published by the Society. Other books should be obtained through the booksellers.

CORRIGENDUM

The Editor regrets that owing to a typographical error the reference to variety 'Herbstsonne' of *Rudbeckia lanceolata* on page 187 of the JOURNAL for June, 1948, was incorrectly printed as 'Herbstsonne.'

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JOURNAL OF THE ROYAL HORTICULTURAL SOCIETY

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Part 8

August 1948

THE SECRETARY'S PAGE

Subscriptions—Fellows who have friends who are thinking of joining the Society are reminded that, as half the year has passed, anyone elected after the end of June is required to pay only half a year's subscription in respect of the remainder of the current year. The Secretary will be pleased to send a form of application for Fellowship on receipt of a postcard.

Programme of Meetings—During August and September there will be the following Meetings and Shows:—

- { Tuesday, August 10—12 noon to 6 P.M.
- { Wednesday, August 11—10 A.M. to 5 P.M.
- { Tuesday, September 7—12 noon to 6 P.M.
- { Wednesday, September 8—10 A.M. to 5 P.M.
- { Tuesday, September 21—12 noon to 6 P.M.
- { Wednesday, September 22—10 A.M. to 5 P.M.

Competitions—At the Show on August 10 and 11 there will be a Gladiolus Competition (which includes a class for the Foremarke Cup) and also a Hardy Flower Competition. On September 7 and 8 there will be three competitions for amateurs, a Cactus and Succulent Competition, a Flower Arrangement Competition and a Plum Competition. For schedules of all these competitions application should be made to The Secretary, The Royal Horticultural Society, Vincent Square, S.W. 1. In conjunction with the Society's Show on September 7 and 8 the Alpine Garden Society and the British Fuchsia Society are each holding competitions.

Lectures—There will be a discussion on Gladioli on August 10, opened by MR. A. J. MACSELF. On September 7 MR. C. E. HUBBARD will give a lecture on "Ornamental Grasses." On September 21 a lecture will be given by DR. A. M. MASSEE, who will talk on "Spraying in the Fruit Garden." All the above will be at 3 P.M. in the Lecture Room in the New Hall.

Kindred Societies' Shows—The National Dahlia Society is holding a Show in the Old Hall on Tuesday and Wednesday, September 14 and 15. On Tuesday, September 14, the National Chrysanthemum Society will be holding a Show in the New Hall, and on Friday, September 17, there will be a Show in the New Hall organized by the National Rose Society. On Tuesday and Wednesday, September 28 and 29, the R.A.F. Flower Show will be held in the Old Hall. Fellows' and Associates' tickets admit to all but the National Chrysanthemum Society's Show.

Demonstrations at Wisley—The following demonstrations will take place at Wisley during August and September, the demonstration on the second day being in each case a repetition of that given on the first:—

Flower Garden

Wednesday and Thursday, August 4 and 5—Vegetative Propagation of Shrubs and Herbaceous Plants (2–4 P.M.)

Vegetable Garden

Wednesday and Thursday, September 15 and 16—Harvesting and Storing (2–4 P.M.)

Distribution of Seeds from Wisley—Last year the response from Fellows to the appeal for surplus seeds for distribution from Wisley was excellent. It is hoped that once again any Fellows who have such seeds from their gardens, especially of good or unusual plants, will be kind enough to collect them and send them, carefully labelled with the name of the plant, to the Director, R.H.S. Gardens, Wisley, Ripley, Woking, Surrey.

General Examination Results.—At the General Examination in Horticulture, held on March 24, 1948, there were 828 candidates, of whom 428 were successful, 43 being placed in Division I and 385 in Division II; 400 candidates failed to satisfy the examiners. At the General Examination in Horticulture for Juniors, *i.e.*, those under 18 years of age on March 1, 1948, which was also held on March 24, 1948, there were 288 candidates, of whom 100 were successful, 188 having failed to satisfy the examiners. Both these examinations consisted of written work only.

Queen's Institute of District Nursing—Fellows of the Society are reminded that very many beautiful gardens throughout the country are open to visitors at various times during the year in connection with the above charity. An admission fee of 1s. is generally payable and all proceeds are handed over to the Institute. This affords an excellent opportunity of seeing gardens which are not at other times accessible to the public. Lists of gardens and the times at which they are open can be obtained from the Organizing Secretary, National Gardens Scheme, "Craigleith," Kersfield Road, Putney, S.W. 15.

Mr. W. B. Cranfield—Many old Fellows of the Society will have heard with regret of the death, in his 90th year, of MR. W. B. CRANFIELD, F.L.S., V.M.H., a prominent member of the Society. Just before his

death, MR. CRANFIELD very kindly offered to donate to the Society his collection of ferns and certain records which he had made concerning them. MR. CRANFIELD visited Wisley and chose the site where he thought his ferns would do well; this is near the Award of Merit Garden. It is hoped that arrangements can be made with his testators for MR. CRANFIELD's generous offer to be carried into effect, and that Fellows will be able to see in due course his collection of ferns displayed to their best advantage there.

Publications—A reprint of the report issued after the joint conference on Rock Gardens, held by the Royal Horticultural Society and the Alpine Garden Society, in 1936, entitled *Rock Gardens and Rock Plants*, is now available, bound in cloth, price 10s., postage 9d.

WISLEY IN AUGUST

DURING this month the Herbaceous Borders, Dahlia trials and the many annuals on the Floral Trial Grounds provide the chief points of interest, while the approach of autumn is heralded in Seven Acres by the ripening fruits of several species of *Berberis* and *Cornus*.

Near the entrance *Perowskia atriplicifolia* produces long spikes of violet-blue flowers above its small grey leaves, in contrast with the long beds of red *Verbena* on either side. Along the old Rose Walk the summer bedding is forming a delightful picture in soft reds, blues and yellows with silver dot plants. The terminal beds at either end are filled with bedding *Petunias* which have flowered continuously since June; they are easily raised and provide a very useful addition to the selection of annuals used for summer bedding.

The Dahlia trial is now in full flower and well worth inspecting by all those interested in these flowers; the true character of a variety is displayed far better in beds such as these than when the blossoms are arranged in the fine masses of colour we see at the shows.

Turning to the left at the end of the Dahlias we reach the trials of annuals; many are being repeated from last year as they were so damaged by hail and torrential rain in July that judging was impossible. Dwarf *Nasturtiums* in many colours occupy the beds near Battleston Hill, while annual *Scabious*, *Calendulas*, *Clarkias* and *Godetias* are in full flower beyond the *Delphiniums*.

On the opposite side of the Dahlias the earliest varieties of *Chrysanthemums* will be opening their first blossoms.

The long Rose Borders form twin multi-coloured ribbons up the hill towards the weather station, while near the two small glasshouses, newly erected for the guidance of Fellows with limited gardens, will be found the hybrid *Buddleia Weyeriana*, the result of crossing *B. Davidi* (*variabilis*) and *B. globosa*.

The long border of annuals will be at its best during the early part of the month, but many kinds are included to prolong the display into September; last year one of these, *Cosmos* 'Orange Ruffles,' was the most outstanding plant in the border during the late summer, while

groups of French and African Marigolds and mixed pink and white *Cosmos* were also very noticeable.

Near the Alpine House will be found two small beds filled with *Salvia coerulea*, a brilliant blue late-flowering perennial, and *Hypericum* 'Rowallane Hybrid' with large golden-yellow blossoms produced over a long period. Next to these after passing the Herb Border is a collection of *Gazanias*, tender perennial composites from South Africa with a striking range of orange, copper or yellow flowers, often enhanced by zones of contrasting colours near the centre; the flowers only open in sunshine, but when the beds are seen on a warm, sunny day, they provide a glistening selection of vivid colours.

The Alpine House contains many of the plants noted last month, with additional *Campanulas*, and *Gentiana saxosa*, a white species from New Zealand. Other plants in flower include the tender, shrubby *Gilia californica*, *Limonium* (*Statice*) *ornatum* with delicate sprays of pink flowers, and the prostrate *Nertera depressa* with its bright orange berries; in addition, pans of *Thalictrum kiusianum* and *Amaracus pulcher*, with sage-green foliage and nodding rose-purple heads provide a pleasing upright contrast to their many trailing companions.

The Rock Garden is largely devoted to blue flowers during this month, with the summer *Gentians* outstanding; other blues include *Cyananthus lobatus* and the bronzed foliage and blue flowers of *Cerato-stigma plumbaginoides*; *Anagallis collina* with bright orange blossoms blends pleasingly with the varieties of *Mimulus* planted on the side of the stream.

In the ponds several Waterlilies and *Sagittaria japonica*, a large Arrowhead with whorls of white three-petalled flowers, form a happy combination with the bold clumps of *Lysimachia* and *Lythrum* planted on the verges.

On the Alpine Meadow the large groups of *Yuccas* often produce flower spikes at this season, and the large bush of *Clethra alnifolia* will be covered with racemes of fragrant white flowers.

In the Wild Garden *Gentiana asclepiadea*, the Willow Gentian, sows itself freely and its waving sprays of blue or white flowers brighten every shady corner. Few flowering shrubs are at their best this month, but a large bush of *Hydrangea paniculata* var. *grandiflora* is conspicuous; its large pointed heads of sterile white flowers, which last for many weeks before they fade to pale green with pinkish margins, finally brown only with the onset of winter. Other shrubs include the hybrid *Eucryphia nymansensis* (*glutinosa* × *cordifolia*), *Cyrilla racemiflora* with long racemes of cream-white blossoms, and a large tree of *Oxydendrum arboreum* with a very similar type of inflorescence.

New plantings between the Wild Garden and Seven Acres designed to give more summer flowers were completed during the early spring and the young plants of several varieties of *Hydrangea macrophylla* (*hortensis*) are already producing a few flowers.

The Heath Garden is the main centre of interest in Seven Acres, many varieties of *Erica* derived from our native species, *Erica cinerea* and *E. Tetralix*, together with many forms of *Calluna vulgaris*, and the Dorset and Cornish Heaths mentioned last month, commence to flower

at this time; while *Daboecia cantabrica*, the Connemara Heath, produces a long succession of large purple or white bells until severe frost puts an end to the display.

Other interesting shrubs include *Hypericum patulum* var. *Forrestii*, *H. prolificum*, *Spirea Bumalda* and the variety 'Anthony Waterer,' *S. Margaritae*, and *S. arborea* with large plumes of white flowers enhanced by the decorative pinnate leaves. Amongst the summer-flowering shrubs planted in the borders, *Buddleia Davidi* and its several varieties are always noticeable owing to the attraction the mauve or pink flower spikes possess for butterflies.

The small stream dividing Seven Acres from the Pinetum has been provided with a series of miniature waterfalls and the banks have been planted with drifts of *Hydrangea macrophylla* (*hortensis*) and *H. serrata*, while retaining the large number of Daffodils already naturalised in this part of the Garden.

The Herbaceous Borders are now in full flower, and while it is difficult to choose individual plants for special praise, a few are conspicuous for their long season of bloom. *Coreopsis verticillata*, with feathery foliage and yellow flowers, is a delightful plant for the front of the border; there is a small trial of this plant on the Floral Trial Grounds. *Salvia uliginosa* reaches a height of 4 or 5 feet, terminating in sky-blue racemes on wand-like stems which do much to brighten the borders during the late summer; *Aster acris* forms neat upright bushes of mauve flowers with yellow centres, while Bergamots, Rudbeckias and *Statice latifolia* contribute to the mosaic of colour.

Beneath the old Apple trees the collection of herbaceous Phlox are in full flower; pink, mauve, scarlet, white and many intermediate shades are all represented amongst these valuable border plants. Slight shade or a moist situation generally gives the best results and assists in keeping the clumps well furnished with foliage at the base throughout the summer.

In the Award of Garden Merit Collection, hardy Fuchsias, *Eucryphia glutinosa*, Ceanothus 'Gloire de Versailles' and the Rose 'Fellenberg' are in full flower, while the border of herbaceous perennials is also bright with Stokesia and Rudbeckias.

On the wall surrounding the Frame Yard, *Clematis Rehderiana* is producing large terminal panicles of pale yellow, bell-shaped flowers, and in the border *Ceratostigma Willmotianum* is opening its first deep blue Plumbago-like blossoms, which continue to appear until October, when the onset of winter terminates the display.

Round the Laboratory walls *Campsis* (*Tecoma*) *grandiflora*, *Abelia Schumannii*, the hybrid *A. grandiflora* and *Indigofera pendula* are all in flower, with, perhaps, a second crop of pale blue flowers from *Clematis macropetala*.

THE HOUSE OF VEITCH

Charles H. Curtis, F.L.S., V.M.H.

PART I

TO the great majority of an older generation of gardeners "Veitch's" simply meant the MESSRS. JAMES VEITCH AND SONS' Royal Exotic Nurseries, King's Road, Chelsea, London, for "Veitch" was a household word among British horticulturists, and famous in Europe, Asia, Africa, America and Australasia. Although the House of Veitch seemed to have been established at Chelsea "from time immemorial", and likely to stand for ever, its origin and end cover a comparatively short space of time. Its influence, however, was extraordinary among gardeners, seedsmen and nurserymen, while its publications remain classics of their kind even to the present day.

JOHN VEITCH, a native of Jedburgh, Scotland, was land steward for many years to SIR THOMAS ACLAND at Killerton, Devonshire, and he founded the Killerton Nurseries at Lower Budlake, in 1808. But Killerton was "in the country" although only eight miles from Exeter, and MR. VEITCH felt his best interests would be served by an establishment in the Devonshire capital, so, in 1832, he purchased land at Mount Radford and established the Exeter Nursery. Here, with his son, MR. JAMES VEITCH, born at Killerton in 1792, he gradually developed an extensive business, chiefly in trees and shrubs, and sent MR. THOMAS LOBB to Java and MR. WILLIAM LOBB to South America to collect seeds and plants. The firm became known as MESSRS. JAMES VEITCH AND SONS, and in 1853, seeking for further development it purchased the business and acquired the land of MESSRS. KNIGHT AND PERRY at Chelsea, where MR. JAMES VEITCH the younger took charge, while his father remained at Exeter, with his second son, MR. ROBERT VEITCH. Later, after the death of MR. JAMES VEITCH, the businesses were separated, the Exeter business under the title of MESSRS. ROBERT VEITCH AND SON, and the Chelsea business as MESSRS. JAMES VEITCH AND SONS. MR. ROBERT VEITCH had a son, MR. PETER C. M. VEITCH, who also remained at Exeter. MR. JAMES VEITCH had three sons, MR. JOHN GOULD VEITCH, MR. HARRY JAMES VEITCH and MR. ARTHUR VEITCH. The first of these died in 1870, and the last in 1880, but MR. HARRY VEITCH reigned alone at Chelsea for twenty years, with the responsibilities of the extensive nurseries at Coombe Wood—trees, shrubs and herbaceous plants; Feltham—garden plants, florists' flowers, and seed production; and Langley—tree and bush fruits, and, later, Orchids.

The Chelsea Nurseries, as I knew them, extended from King's Road to Brompton Road, bounded on the one side by Gunter Grove and on the other by St. Mark's College and grounds. By far the larger part was covered with ranges of glass houses, but there was a service entrance from Brompton Road for the cartage of coke, loam, manure, pots and other necessary materials. The spacious offices, seed warehouse, library, and herbarium were located at the King's Road end and included

handsomely furnished rooms where wealthy customers, botanists, foreign visitors and returned collectors were entertained by the proprietor, or MR. MANNING, the tall General Manager. The roomy packing sheds, presided over by MR. BLACK, who was also timekeeper, opened on to Gunter Grove.

In so large an establishment it was obviously advantageous to create many departments, each a distinct and independent entity, under a capable and experienced foreman responsible only to MR. HARRY VEITCH. MR. CHARLES CANHAM presided over the large Orchid Department; he was a rather short, Falstaffian man, so broad, in fact, that during most of his later years he could not squeeze himself through the doors of the smaller house—he could only look in and give orders. The very important New Plant Department, in charge of MR. JOHN HEAL, consisted of two long ranges and the big Amaryllis House; all this was strictly private, and there were no handles on the outer doors. MR. GEORGE SCHNEIDER, a Frenchman, author of the three-volume *Book of Choice Ferns*, was head of the Fern Department—a very knowledgeable man, soft of speech, and kindly, who presided in genial and fatherly fashion over the meetings of a society whose members were foreigners obtaining horticultural education and experience in the Metropolitan area. MR. TIVEY, tall and alert, controlled the Tropical Department and was a past master in the cultivation of Nepenthes, Anthuriums, and Codiaeums. In the Greenhouse Department, MR. WEST grew Gloxinias, Ixoras, and many other decorative flowering subjects. The Soft-wooded and Hard-wooded Departments were very busy in those days, for summer bedding still occupied a very important place in the annual routine of gardening; MR. MINNS—known as “The Doctor”—had charge, and MR. WEEKS was his deputy. MR. WILKINS, foreman over the Vine Department, grew wonderful vines—planting vines—but no Grapes, and perhaps the thought that others reaped the fruits of his labours had something to do with his acidity and hermitic retirement from the company of his fellows. A bright-eyed, humorous, and altogether kindly person, MR. JOHN SEDEN was not often seen, as his department was tucked away in a corner, behind the corridor entrance from Brompton Road; it was known as the Propagating Department, and so it was, but with a difference, as it was here the famous early hybrid Orchids and the hybrid Nepenthes, among other rare subjects, were raised. It should be stated here that each department had its own propagating section.

At the other end of the establishment MR. DAVISON presided over the Seed Department; his was a particularly distinct personality, and he looked more like a professor than a seedsman; he never used two words where one would suffice, but he was liked by everyone. His deputy was the tall and gentlemanly MR. ALFRED DAWKINS.

The Decorative Department was close to the New Plant Department, and MR. ARCHER, “man about town”, alert and clever, kept his men working at high pressure in the London Season, as, in those days, the town houses of nobility and the more important hotels, were decorated in prodigal fashion for all social functions. Much of his seasonal flowering and other subjects were obtained from MR. W. ICETON, who had a market nursery at Putney Park Lane, Roehampton—a tall,

handsome man who travelled in a beautiful trap that always had a fine horse in the shafts.

MR. MAULE, and subsequently MR. HARROW, had charge at Coombe Wood, where, in later years, the material collected by WILSON and others, was dealt with. MR. HEAL appeared to have the oversight of the Glass Department at Feltham, while MR. ALLGROVE managed at Langley. All the heads of departments were clever and experienced men and their loyalty to the firm was unswerving. I have no idea of the salaries paid them, or their deputies—one in each department—but a very large amount of the nursery work was done by men “in for a job”, or young fellows desirous of training and engaged for a period of two years at 12s. per week during the first year, and 15s. in the second year, plus a slightly higher rate for Sunday duty—usually once in three weeks. The hours were 6 A.M. to 6 P.M. on all days but Saturday, when business stopped at 5 P.M., and, later on, at 4 P.M. Discipline was splendid, though a trifle irksome on occasion. A man fifteen minutes late in the morning might be sent back until after breakfast and would then “lose a quarter”.

Men who worked in the nursery while waiting for an appointment used to take matters easily, but the young fellows—the two-year men—had to toe the line.

My father and JOHN HEAL went to school together and both had their early horticultural training at MESSRS. BALE'S Nursery, Westacott, Barnstaple. They came up from Devonshire in early manhood, HEAL going to Coombe Wood and my father to the Mt. Ararat estate at Wimbledon, where, in due course, I was born. After experience in a local nursery and two private gardens I thought I would like to follow in the steps of my uncle CHARLES, who had been a collector for the MESSRS. VEITCH and in that capacity had visited Madagascar, Borneo, and other places in the Far East, but by this time was Superintendent of the Penang Botanic Gardens. My wish was forwarded to MR. HEAL and so soon as there was a vacancy in his department I went to Chelsea and “signed on” for two years. They were happy and interesting years—raising new *Hippeastrums*, new *Streptocarpuses*, new *Phyllocacti*, new *Clivias*, new Greenhouse *Rhododendrons*, and the quite new race of Winter-flowering *Begonias*, besides propagating anything (other than Orchids) sent home by BURKE, who was the last of the Veitchian collectors sent to tropical countries.

MR. HARRY VEITCH—he was knighted at a much later date, but I always like to remember him as SIR HARRY—was broad-shouldered, bearded, boundlessly energetic and a splendid man of business. Slightly abrupt in speech, indeed almost brusque when dealing with someone he did not know, or knew nothing to his credit, MR. HARRY was really a very kindly man and extremely generous to any good cause that appealed to his piety and charity. He had the control of a tremendous business, and, unquestionably, he controlled it (Fig. 90).

The following story—a perfectly true one—tells of my first meeting with MR. VEITCH. When I entered service at Chelsea it was impressed upon me without any room for misunderstanding, that if I permitted any unauthorized person to enter any part of the New Plant Department

I would suffer instant dismissal. There were no door handles to the houses, but the spindle had a filed notch into which the edge of a penny piece could be thrust deeply enough to serve as a lever to lift the latch.

Judge my surprise, therefore, when one morning the outer door of my range burst open, a burly, bearded figure entered and shouted for "HEAL". I rushed towards the intruder, told him what I thought of him, and added that if he wanted MR. HEAL he should knock at the door and not burst the lock, that probably MR. HEAL was in the office in the next range and if he burst into the said office, unannounced, he would hear all about it. The man with the beard disappeared without a word and the door closed. About half-an-hour later MR. HEAL came in and in his severest tones announced, "Young man, you *have* done a fine thing for yourself; don't you know who it was you turned out just now?" I assured him I had no such knowledge and that I had carried out instructions to the best of my ability. "Well, for your information, that was MR. HARRY VEITCH." I waited for the axe to fall, but—"He wanted to know who was the young man in the 'little range'; I told him your name and said you were a nephew of CURTIS, a former collector, and he replied, 'He's a sharp lad, we shall have to keep our eyes on him.'"

But that is not the whole of the story that commenced during my first week at Chelsea. During the afternoon of the day following the "incident" I heard the click of the latch of the door at the far end of my range and, very quietly, MR. VEITCH entered; he seemed to take a long time in coming through the lower houses, looking to right and left at the plants. *At last* he came into the house where I was attending to seedlings of many kinds and, nodding pleasantly, said "Good afternoon CURTIS, have you a plant of *Begonia Froebelii*?" I acknowledged the greeting, found the plant he asked for and expressed the view that it was a small specimen and not an easy subject to grow. By this time I was getting warm under the collar and said, "Shall I tell MR. HEAL you are here?" He hesitated a moment and replied, "Yes, perhaps you might." As I turned to find MR. HEAL, he stopped me with "CURTIS, I promise not to steal anything while you are gone!" Some kind fairy prompted me to say "Thank you Sir." I hurried round to the departmental office, found "JOHN" sitting on his high stool, from which he promptly slid as I entered, rushed down the big range and started a conversation with MURRAY, the deputy-foreman. I followed, told him that MR. HARRY would like to see him in the little range. His reply, with a chuckle in it, was "All right; tell him I'll be along presently." So strange a message indeed that I wondered what sort of reception it would receive, but there was no need to worry, for MR. HARRY had vanished!

How did the two-year men live at Chelsea on 12s. or even 15s. per week? Some had considerable financial assistance from home; others had not; I had not. I obtained board and lodgings, over a grocer's shop in Ifield Road, West Brompton, at 10s. per week, which left 2s. for fares home and back and for the "pleasures of life!" Those of us who were not "remittance men" walked many miles to save bus and rail fares. Two or three of us took courses in Botany and Biology, under HOUSTON, at the Birkbeck Institute. A bus fare was necessary to get us

to Chancery Lane in time, but we walked back to Chelsea, with a halt at Victoria Station, where, in the corner of the station yard, we could obtain the largest possible cup of coffee for 1d., and the biggest Bath bun for the same price.

We were encouraged to study and obtained financial assistance by working overtime in the seed warehouse, packeting seeds, and later, in the office, making out the bills from marked copies of the Order Sheets; there were no typewriters in those days! The money thus earned was paid in a lump sum at the end of the season and enabled us to buy clothes—you could get a good overcoat in Lambeth Marsh—where old WILLIAM CURTIS, of *Botanical Magazine* fame, formerly had his garden—for £1. We were busy, keenly interested, poor, but happy. Those were the days! There was one great day, when JOHN SEDEN called us along to see the first Brasso-Cattleya!

The years passed. I went to Kew and then to Chiswick, joined the staff of *The Gardeners' Magazine*, and eventually *The Gardeners' Chronicle*; throughout that long period MR. HARRY VEITCH was my friend and would often introduce me as "the only man that ever turned me out of my own nursery." Whenever I revisited the Chelsea Nursery I frequently entered by ways that others knew not, but so soon as I saw MR. HEAL a messenger was sent hot foot to notify MR. HARRY of my presence and if he was about he would come along for a chat.

MR. HARRY VEITCH had no children, but there were two nephews, MR. JAMES H. VEITCH and MR. J. GOULD VEITCH, sons of MR. J. G. VEITCH, and these were brought into the business. MR. JAMES had been "round the world", and the story of his journey is told in *A Traveller's Notes*. He was alert, energetic and rather fiery; his brother was quiet. In due course MR. HARRY VEITCH retired, the firm was converted into a Limited Liability Company, and the conduct of the huge business fell upon the shoulders of MR. JAMES H., with his brother as Secretary. For some years he made a good job of it, but eventually the burden of responsibility proved too heavy, he became eccentric and unwittingly contrived to antagonize his departmental managers and also many customers. His very keenness led him to interfere unnecessarily and this created so much uneasiness that the big business no longer ran smoothly.

And so the great-hearted leader left his retirement and again took up the management. The return of SIR HARRY was hailed with intense but quiet enthusiasm; he received the utmost loyalty from those who had served him ably for so many years. Offended customers came back and the House of Veitch flourished as of yore. But this tremendous and brilliantly successful effort, together with the accumulating years, demanded payment. Nature would not be denied and he came to a decision that would have broken down a lesser man. His decision was to close down. It was rumoured that he received splendid offers but in every case there was a proviso that the title of the firm should go with the purchase. He would not agree. Some of his departmental managers had died and others had been pensioned; those who had remained loyal were given the opportunity of taking over, as separate businesses elsewhere, the departments they had managed. The Chelsea nursery was dismantled, Coombe Wood no longer bore the name of VEITCH; MR.

ALLGROVE took over the fruit tree nursery at Langley, and MR. ALFRED DAWKINS set up his own seed and bulb business, while MESSRS. BLACK AND FLORY became proprietors of the Orchid establishment at Slough.

King's Road had long been famous for its nurseries, and I well remember the establishments of WILLIAM BULL and MESSRS. WIMSETT. King's Road remains, but all these great establishments have passed away, and few there are who could identify the sites they occupied.

The greatness of several of the older nursery businesses was emphasized by their publications. They issued fine catalogues, freely illustrated. The MESSRS. LODDIGES of Hackney are remembered by *Cattleya Loddigesii* but much more so by LODDIGES' *Botanical Cabinet*. MESSRS. JAMES VEITCH AND SONS enriched horticultural literature by publishing the *Manual of Coniferae*, the monumental *Manual of Orchidaceous Plants*, *A Traveller's Tales* and *Hortus Veitchii*; for the last two MR. JAMES H. VEITCH was chiefly responsible, but DR. M. T. MASTERS assisted in their publication. "Their works do follow them." MR. ADOLPHUS KENT, a small, grey-haired man, with weak eyesight, was general editor of the publications.

The extent of SIR HARRY VEITCH's benefactions will never be known until we shall all have to give an account. On one occasion, knowing I lived at Brentford, he questioned me concerning the Boatman's Mission, which cares especially for the wives and children of the canal-boat people. He was keenly interested and, later, I found that the good work received his personal and financial support. His work on behalf of disabled gardeners and gardeners' widows found its chief expression in The Gardeners' Royal Benevolent Institution. He was Treasurer of this charity for many years and, in addition to liberal annual donations, he established the Victorian Era Fund and The Good Samaritan Fund. He had a charming country garden and in the summer-time would, with LADY VEITCH, entertain his own pensioners, workers of the City Mission, and the Nursery Staffs, and on one occasion invited the members of the R.H.S. Committees and arranged a cricket match between them.

"How are the mighty fallen?" No, not fallen. They have passed away, as all things must pass, but so long as the Royal Horticultural Society and The Gardeners' Royal Benevolent Institution continue, and so long as Orchids and trees and shrubs are grown, the name of VEITCH will remain. The firm was responsible for the introduction of many plants—Orchids, Stove Plants, Greenhouse Plants, Conifers and both flowering and ornamental trees and shrubs, as the pages of the *Botanical Magazine* show. Moreover, the Veitchian firm created several new races of plants, raised many hybrids, new fruits and new varieties of popular vegetables. A list of its introductions would occupy far more space than the paper shortage will permit, but a glance through the R.H.S. records of certificated plants, flowers, fruits and vegetables will show how greatly we are indebted to the House of Veitch.

(To be continued)

GROWING DAFFODILS IN A TOWN GARDEN

Norman F. Lock, F.R.C.S.

(Lecture given on April 6, 1948, Mr. G. W. Leak, V.M.H., in the Chair)

I AM afraid I have very little to tell you that has not been often said and written before by more knowledgeable and competent authorities, but I should like to make a few remarks in praise of the Daffodil, and if I can encourage some beginners to grow them I am sure they will not be disappointed.

“Non semper idem floribus est honor
Vernis”

or as HERRICK has it

“Fair daffodils we weep to see
You haste away so soon.”

Comparatively little has been done to extend the Daffodil season after the beginning of May, when the Poets finish flowering, but there has been some remarkable work done in preparing the bulbs so that they can now be had in flower before Christmas.

Daffodils are the first flowers of the year, which are easily grown in quantity and are good for cutting for house decoration. To my mind the Daffodil has all the qualities that go to make a useful and highly decorative flower. In fact, I do not know any flower that has improved in the last fifty years to the extent that the Daffodil has done and that now exhibits such perfection of form, quality and colour.

Then again it is exceedingly hardy. This year in Devonshire we had a wet, mild January and dry February, so that I had ‘Forerunner’ out by February 20th. Then on the 24th we had 17 degrees of frost with a very little snow. ‘Forerunner’ just laid down on the ground, as did a lot of other buds. Three days later it was mild and it got up again none the worse. I had some ‘Fortune’ cut in the cellar which went down to 28 degrees and the water in the vases froze and some of the blooms went limp and transparent. I brought them into a room just above freezing and they recovered completely and lasted three weeks. Last year we had a wonderful glazed frost in February and the cold weather lasted well into March. In fact, I believe that March 10 was the coldest for a hundred years (and this year the hottest), and that did not harm them. Last March we had 7 inches of rain and this year six weeks of drought from February 4, followed by a gale on March 29 of over sixty miles an hour. I thought my blooms would be ruined, but they stood up to it remarkably well.

Another advantage of the Daffodil is that its cult teaches you to use your eyes. The number of minute points of difference between flowers that are obvious to an experienced eye is amazing as compared with one who has not studied the flower, and I always think that any hobby that teaches you to use your eyes has very good educational value. Incidentally, it has led me to another hobby, which I will mention later on.

Another advantage of the Daffodil is that the bulbs increase rapidly if taken care of. There are some interesting figures in the *Daffodil Year*

Years .	FACTOR									
	1	2	3	4	5	6	7	8	9	10
	1.5	2.25	3.37	5	7.5	11	17	25	37.5	55
	1.6	2.56	4.1	6.5	10.4	16.8	27	42	67	100
	1.75	3	5	9	16	28	49	81	142	256
	2	4	8	16	32	64	128	256	512	1024

Book of 1915, by ALSOP. He weighed all the bulbs he planted and weighed them again after one and two years in the ground. The increase varied for those in the ground one year from 1.5 to just over 2, and for those in the ground two years from 2 to 4. I have made a little Table showing expected increase at these rates. So you see, with a little patience and care, you may soon work up a big stock. In 1926 I bought one bulb of 'Fortune,' and this year I picked over a thousand blooms, although I have disposed of quite a lot of the bulbs from time to time. Again, I bought one 'Carbineer' in 1940 and this year I have counted 110 blooms from the stock. These figures are further borne out by the result of the Daffodil Trials at Wisley and published in the *Daffodil Year Books*. Although you may pay a high price for one bulb in the first instance, at the end of ten years your stock will be worth at current prices generally several times what you paid for it.

Another advantage of the cult of the Daffodil is that it undoubtedly leads to longevity in its devotees; there is an article from the *Daffodil Year Book* for 1946 on octogenarians and Daffodils, and I think I am almost the youngest member of the Narcissus Committee myself.

Now I propose to tell you how I grow my own Daffodils. I first bought a few bulbs as long ago as 1914. I see I started with 'Gloria Mundi,' 'Glory of Leyden,' 'Horace,' 'Firebrand,' 'Madame de Graaff,' 'Madame Plomp' and a few others. In 1915 'King Alfred,' which I have never been able to grow so as to increase, 'Fleetwing' for long one of my favourites, for which I paid the enormous sum of 7s. 6d., 'Cassandra,' 'Cossack' and several others. I had a small town garden at Boston in Lincolnshire then. After that I was away from home, but in 1917 I was stationed in Cambridge, where I started again with 'Florence Pearson,' 'Bernadino,' 'Ivorine,' 'Cleopatra,' 'Weardale Perfection,' 'Sunrise,' and various others. Some of these are still worth growing, though I have discarded them all except 'Bernadino.' After the war I came to Exeter, where I have been ever since.

Of course anyone can grow Daffodils by just buying bulbs in August or September and putting them in the ground anywhere and they will bloom well the first season and perhaps the second; but to grow good blooms there are just one or two rules which should be observed. They must have a piece of ground to themselves; it need not be much. You can get twenty or thirty good blooms from a square yard. The piece of ground you intend to plant should be in the open, not under or too near the roots of trees and yet should be fairly sheltered from the wind, as equinoctial gales are often very shattering just when your best blooms are coming out. Of course, a really exposed site will require some artificial shelter. A deep sandy loam is considered the best type of ground,

but the bulbs can be grown in any kind of soil; from nearly pure sand to a heavy clay. The former will, of course, need a good deal of manuring to supply humus and the latter to be lightened and made porous with lime and added sand. In Holland and the Fens of Lincolnshire there is generally a water table about two feet below the surface, and the roots of the bulbs go down to this and so obtain plenty of moisture. Daffodils like plenty of moisture at their feet, especially in the growing season, but must not get waterlogged. Having chosen your site you must prepare the ground. You must dig deeply; the ground should be trenched to 20 inches or 2 feet deep, the top spit taken out and put below and the bottom spit above, the reason for this being obvious as you plant the bulbs 5 or 6 inches deep, so that the roots start from there and go down at least a foot; the top 6 inches is, so to speak, wasted, except as affording them support. This trenching should be done not later than the first week in July, so as to let the ground settle. The best ground to take will have had a crop of Potatoes or Peas and Beans and will have been well manured the autumn before. Plant the bulbs in rows in August in slightly raised beds like Asparagus beds, about 4 feet wide and an 18-inch path between the beds. I leave a foot between the rows and 4 to 6 inches between the bulbs, according to their size. Put in a good dressing of bone meal while trenching the ground.

I have a small walled garden in the middle of Exeter of about two-thirds of an acre altogether, and I have, I suppose, about an eighth of this under Daffodils. I keep them in their beds two years and then dig them up and replant to another position, and it is quite a job to maintain a rotation so that each plot is not used for Daffodils for at least six years.

Now having trenched and got all ready, I start planting as early in August as possible, but not when the ground is too wet. I dig out a shallow trench 5 inches deep and 4 feet long, put in the bulbs and labels and fill up from the next trench a foot away, and allow 18 inches between plots. When all are planted I go along the 18-inch spaces between the plots and dig out a spit and scatter it on the beds, thus leaving them raised and well drained. Then as soon as there has been a good rain I give them a light dressing of a universal fertilizer. Potash and phosphates are the essential fertilizers for Daffodils. They do not like too much nitrogen, and I do not mind a covering of Chickweed or Groundsel up to January (heresy No. 1). I think it takes the sting out of any excess of nitrogen and also keeps them cool. As soon as the rows are all up they get a good hoeing and the best bulbs get a little more potash fertilizer. After this they are left alone until they start flowering in March. This year the season started very early. 'Forerunner' was out for me at the end of February and 'Fortune' in the first week in March, and were all picked by the 14th. Last year I did not start picking until the last week in March. If it is very dry during the flowering season it may be necessary to water to get good blooms with long stems. Now you will be doing your crossings—I will come to that later.

Be careful in picking not to damage the leaves. Every broken or picked leaf deprives next year's bulb of a proportional amount of nourishment, and when we remember that the bud for next year's flower starts to form in May the importance of this will be realized.

After they have finished flowering I pick off all the heads not required for seed. Seed production undoubtedly takes a good deal of energy and foodstuffs which are being formed by the leaves, and so deprives the bulb of a corresponding amount of food. All April, May and the first part of June the leaves are working overtime building up next year's bulb and then they begin to die off. As soon as they lie down and turn brown I rake them off the first year and hoe over the beds. If it is the second year the bulbs are dug up, the earth carefully shaken out of the roots, and then dried off. I collect them in chip baskets and keep them in the baskets until planting time. Twelve-pound chips will hold forty bulbs or so and allow ventilation. Last year, as soon as the bulbs were dry, I cleaned off the dead leaves and roots (by the way, be very careful not to detach the root plate as so doing kills the bulb). I then dipped each basket in a bath of 1 in 3,000 perchloride of mercury in water for about five minutes, then dried them in the sun as quickly as possible, and then stored them in a cool cellar. The result has been the cleanest crop of foliage this year that I have seen. I think it checked basal rot, which only flourishes at a temperature of over 60 degrees, and prevented cross infection. This is only an idea of mine but it seems to have worked. A trace of perchloride of mercury is left on the bulb and I imagine this is enough to prevent the *Fusarium* fungus from growing. Since writing this I see that much the same procedure is recommended by DR. HAWKER in a paper on 'Basal Rot' in the *Daffodil Year Book* for 1946. I then replant the bulbs as early in August as I can manage. That completes the two years cycle.

Now as to varieties to grow; for a beginner, if you are starting a collection do not buy dozens of one kind unless your purse is unlimited. Bulbs taken care of increase so rapidly that in a few years you will not know what to do with them. Half a dozen bulbs from a good dealer will generally give you a dozen blooms and often more. Personally, since I bought one 'Fortune' bulb in 1926 for £25, which I thought extremely rash, I have hardly ever bought more than one bulb of a kind. That one 'Fortune' bulb has proved itself an extremely good investment and has paid for itself several times over. On the other hand, quite a lot of bulbs have failed to do well with me. Every year since 1926 I have bought a few good bulbs, only one of each, and now I suppose my collection represents four or five times what I gave for it at market prices. There is an interesting paper on 'Good Daffodils as an Investment' by MR. CALVERT in the *Daffodil Year Book* for 1933, which is well worth reading.

But to return to sorts of Daffodils for beginners. For two or three pounds anyone can get 30 or 40 bulbs of really good sorts, which can stand up to competition if well grown with any except MR. RICHARDSON'S or MR. WILSON'S latest productions, and I have shown many of them in quite recent years, which in the absence of much competition have won prizes. To take the classes in order:

Yellow Trumpets—As I have said, I have never been able to get 'King Alfred' to do justice to itself, although it was raised not more than ten miles from my garden. The best early trumpet, to my mind, is 'Godolphin.' I bought one of them in 1929 and now have a nice lot in

spite of having got rid of several in the meantime; it is tall and graceful and of a good colour. 'Elgin' and 'Garron,' two of MR. WILSON'S giants, are good, but I like 'Master Robert' myself, as it is extremely hardy and strong and a very good doer. 'Dawson's City,' 'Principal' and 'Royalist' are other good yellow trumpets.

White Trumpets—Of course, 'Beersheba,' rather short in the stem with me, but otherwise excellent; 'White Emperor,' also rather short; 'Tain,' a very icy white; or 'Scapa' and 'Samite,' rather more expensive.

Bicolor Trumpets—'Mrs. Mudge,' late and a little clumsy but still one of the best of the bicolors; 'Sincerity.'

Incomparabilis varieties—Take the 2a first, those with yellow perianths, yellow selfs 'Havelock,' 'St. Egwin' and 'Crocus.'

With coloured cups—Of course, 'Fortune,' I suppose, after 'King Alfred,' the greatest advance in Daffodils; and now also there are a lot of 'Fortune's' offspring; 'Killigrew,' still one of my favourites; 'Porthilly,' a rather more modern one; 'Carbineer,' a good doer, but inclined to get coarse with me; 'Dunkeld,' a little more expensive but very good.

Bicolor Incomparabilis varieties—'Bodilly' and 'Nissa,' both lovely flowers and very good doers. Slightly more expensive, 'Polindra,' for several years first in the Daffodil ballot; 'Cardigan' and 'Greeting.'

Bicolor Incomparabilis varieties with colour—All rather expensive but some of the most effective Narcissi for show; 'Flamenco' and 'Rhyader.'

Barrii varieties with yellow perianths—'Seraglio,' Award of Merit, 1926, still one of the best, a good doer, but makes a small bulb and increases rapidly. *Barrii* with yellow perianths are very few in number, I think MR. RICHARDSON has only three in his catalogue.

Bicolor Barrii varieties—'Mr. Jinks,' 'Coronach' and 'Sunstar,' very lovely and striking flowers.

Leedsii—There are many very lovely *Leedsii*. Cheap and good doers are 'Mitylene,' 'Niphetos,' 'Dunlewey,' and 'Brunswick' (Fig. 92), a very lovely thing with which I got a best bloom prize at a local show; 'Carnlough' and 'Slemish.'

Small-cupped Leedsii varieties—'Cushendalk,' a very beautiful symmetrical little flower with almost green eye; 'Samaria.'

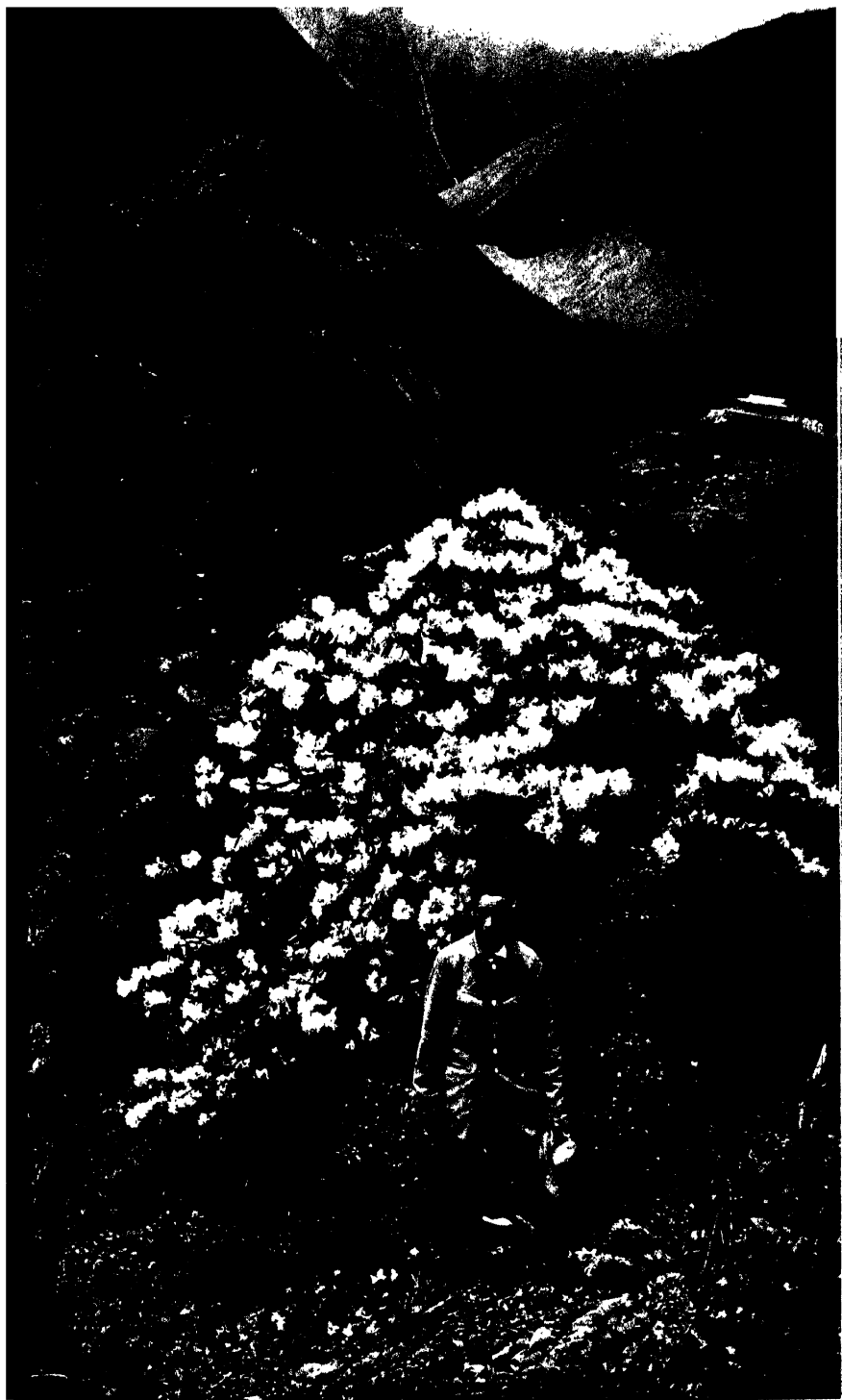
Triandrus—'Silver Chimes,' a very pretty thing and very sweetly scented.

Poetax or *Polyanthus* varieties—'Medusa,' 'Glorious,' 'St. Agnes' and the modern 'Cragford.' (Fig. 93).

Poets—Poets are all fairly cheap, scented and lovely. The best are 'Hexameter,' 'Red Rim,' 'Sarchedon,' 'Smyrna' and 'Seagreen.'

From these you will be able to select a good collection to start with. If you want the latest and best kinds the *Daffodil Year Book* for the last several years have published the results of a ballot, which gives you lists of the best kinds for show, for the garden, for forcing, etc., chosen by people who have specialized in Daffodils for many years. One of each of the best twelve in the latest list will cost perhaps £50. There is a good article also in *Gardening Illustrated* for April on the most modern kinds.

Well, now we have got our collection and planted them, and they are coming up nicely in January and February, give them a good hoeing between the rows and keep your feet off the bed.



Photo, J. F. Rock

FIG. 89—*Rhododendron Souliei* on the slopes of Mi-nyag dGangs-dkar, Eastern Tibet, July 1928
(See p. 266)



THE HOUSE OF VEITCH

FIG. 90— Sir Harry Veitch, from a painting hanging in the Council Chamber of the R.H.S.
(See p. 244)



THE HOUSE OF VEITCH

FIG 91—*Anthurium Veitchii* [from *Hortus Veitchii*, 1906]



Photo, W. Abbing

FIG. 92.—*Narcissus* 'Brunswick,' F.C.C. 1939 (See p. 252)

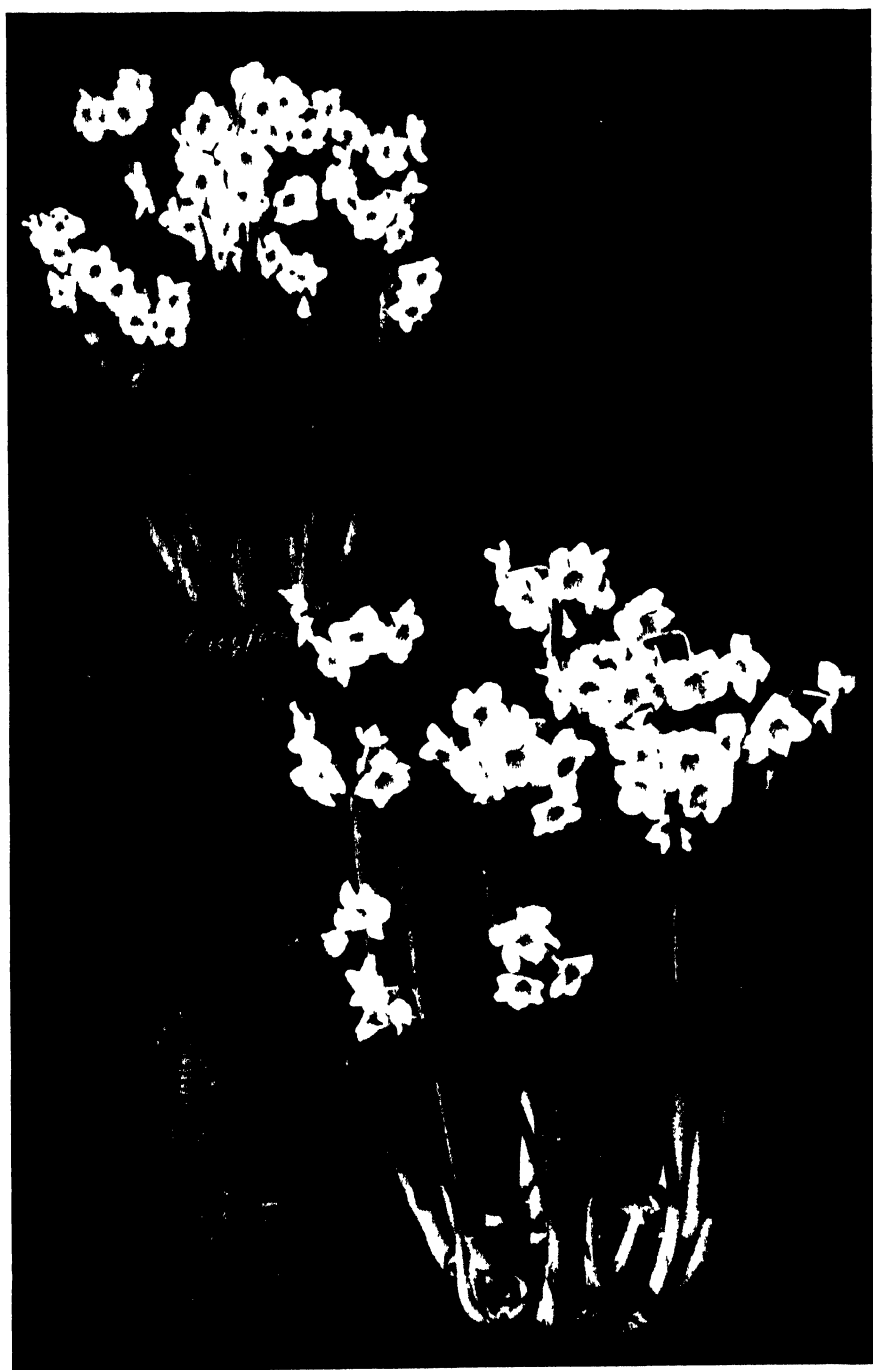


FIG. 93—Narcissus 'Cragford' as exhibited at Lisse, Holland, on December 24, 1946.
F.C.C. February 18, 1947 (See p. 252)



FIG. 94—Los Organos, Sierra de Cazorla (See p. 262)



Photo, R. A. Malby

THROUGH SPANISH SIERRAS
FIG. 95—*Viola cazorlensis* (See p. 261) *



THROUGH SPANISH SIERRAS



FIG 97—*Magnolia Wilsoni*, one of the notable trees and shrubs exhibited at Chelsea, 1948 (See p. 266

If you want to send Daffodils to your friends pick them in bud just as they burst, after the heads are bent and when they are showing colour. Pack firmly in long boxes—they will travel beautifully and come out directly they are put in water. You probably will not get exhibition blooms, but very nearly.

Picking for exhibition—It is best to pick most kinds as soon as they are well open, but occasionally, in bad weather, it is better to pick soon after they have burst and bring them out in water indoors. I often find this best, as rain may bring down soot from the hospital chimney which is close to my garden, and this is very difficult to get off. Packing blooms for show is almost an art in itself, and any exhibitor will show you how it is done.

Now as to making your own crosses and getting your own seed (another heresy). I do not always pick off the anthers, and I see that I am not quite alone in this, *cf.* Paper in the *Daffodil Year Book*, 1940; and further, I am afraid I do not keep records of the crosses made. It is not laziness alone, but when I started crossing Daffodils in 1920 I religiously kept records and put my seeds in boxes all labelled, and one day, two years later, my small daughter, aged four, brought me a bunch of labels saying: "Look Daddy I've cleaned up all your dirty sticks out of your boxes." Well since then I have made my crosses and sown the seeds and left it at that. A further reason is that I very seldom get the time to do the crossing properly as I can often only snatch a quarter of an hour at lunch-time, when all one can do is to make the crosses and mark the flower, and anyway a bee may come along who knows better than you do and upsets all your calculations. I believe it is best to do the crossing on a sunny day between 10 and 11 in the morning as that gives the pollen grain the best chance of germinating and sending the pollen tube down into the ovary. When you have made your crosses tie the flower up to a stick loosely and, of course, you ought to label it and record the crosses in a book kept for the purpose. All the great breeders do this I have no doubt, and you will find the pedigrees of many of the best new Daffodils carefully recorded. On the other hand, lots of the very best are of quite unknown pedigree, I believe 'Fortune' and 'King Alfred' appeared in unlabelled seed beds, so you never know your luck. Unfortunately 95 to 99 per cent. of your seedlings will probably be inferior to kinds already grown, and it is probably less than one in a thousand which is really worth while, but if you use really good parents and read the articles on breeding in the *Daffodil Year Books* by THE BRODIE OF BRODIE in 1934 and GUY WILSON in 1935 you will probably get some good results.

Seedlings—I sow my seed generally in August or September, in a piece of ground about 3 feet by 6 or 7 feet, with boards all round that have been painted with cuprinol to preserve them, not in boxes. The ground has been prepared just as for Daffodil bulbs, but I add a little sand and raise it so that it is two or three inches higher inside the boards than outside. I sow the seeds in rows about half an inch deep, an inch apart in the rows and the rows three inches apart, and leave them there for four years, and I generally sow about 500 seeds a year. At the end of four years I dig them up and plant them out at once into ordinary Daffodil beds. A few may even make their first flower in the boxes in the

fourth year and most will have flowered within the next two years, when good ones are marked and all the indifferent ones discarded. It is difficult to be quite ruthless enough in discarding, but want of space obliges me to be fairly drastic. The selected ones are grown on for further selection for another two years. Here I would like to put in a plea for short Daffodils for growing in pots for the house. Short, sturdy kinds, like 'White Emperor' and 'Beersheba,' can be grown indoors so as not to require any sticks to support them, and I think they look nicer than tall kinds supported by sticks and tied up, however skilfully this is done. I have two or three nice seedlings of my own which are very short when grown outside but grow nicely in pots. I find that bulbs grown in pots generally do not develop as much colour as those grown out-of-doors. Is this due to the cutting off of the violet end of the spectrum by the glass of the greenhouse? How very little we really know about photosynthesis. What are the optimum conditions of the process. We know that there must be moisture and light for the chlorophyll in the leaves to function, but can you have too much light? And how much darkness, if any, is necessary? You would think that one ought to be able to grow better blooms in the North as there the season is later and they have much more daylight in May and June, but I do not know that there is any evidence for this. I do not believe there is any regular record of the actinic value of light kept anywhere beyond the record of the hours of sunrise and cloud, and I do not know of any kind of mechanical recording device for the purpose. Anyway, as far as I know, Daffodils can be grown exceedingly well in any part of the British Isles and in most parts of the temperate regions where there is a rainfall of more than 24 inches a year.

I said earlier that Daffodils should be grown in the open, but I am not sure that this is really good advice, though I think that most of the big growers and dealers do this. In nature the Daffodil is certainly a partial shade plant. In Devonshire the *N. Pseudo-Narcissus* grows along the banks of streams and rivers in association with and under Hazel and Scrub Oak. They have plenty of light till after they have flowered and then, in April and May, are mostly in the shade. I think the answer to a question I put just now with regard to photosynthesis is that Daffodils do well in partial shade and do not like too much direct sunlight, so I suggest possibly the best place to grow Daffodils is in an open orchard between standard Apple trees. A friend of mine who used to exhibit many years ago, MRS. GAGE-HODGE, grew her Daffodils in a fairly heavy clay in an orchard and used to have masses of magnificent blooms. I think that colour in Daffodils depends on plenty of sunlight in the early part of their growth. I notice this year that 'Fortune,' which came out early after a mild but rather dull spell, had comparatively little colour. Later on we had a lot of sunshine and later kinds developed very good colour. Colour is due to carotene, which is a relative of chlorophyll and develops best under the influence of the violet end of the spectrum. It is, of course, the precursor of vitamin A in the body of animals.

Diseases are many and I do not propose to say very much about these. Is it not written *in extenso* in the *Daffodil Year Books* and the publications of the Ministry of Agriculture and Fisheries. Daffodil flies,

Merodon, the large *Narcissus* fly and Eumerus, the small *Narcissus* fly (Board of Agriculture Leaflets).

For *Tylenchus devastatrix*, the minute nematode, of course there is the hot-water treatment of MR. RAMSBOTHAM. You require an apparatus with a thermostat and keep them in water at 110 degrees Fahrenheit for two to three hours. I have another method, or rather an additional method, which I am sure has helped to keep my own bulbs in good health. If I see an empty patch or a mangy-looking plant in a row I give it a gallon or so of water with 1 in 3,000 perchloride of mercury and a day or two later dig it up and burn it. I believe the perchloride of mercury kills any *Tylenchus* which may be wandering about in the soil. I have had a little trouble with *Tylenchus* from time to time, but only very occasionally have I had to use the hot-water treatment, in spite of using the same piece of garden several times over for bulbs, as well as for Onions and Carrots, at intervals during the last twenty years.

Basal rot is due to a fungus which attacks the root plate to which some varieties seem more subject than others. As soon as the bulbs have dried I clean off the dead leaves and roots and then dip them for five or ten minutes in a 1 in 3,000 solution of perchloride of mercury and dry them as quickly as possible and store in a cool cellar until they are ready to be planted again in August. By using these methods I have not had to treat my bulbs with hot water for several years now. Last autumn I dipped all my bulbs in the perchloride solution and this year they have come up more regular and healthy-looking than I can remember. I would suggest putting 1 in 5,000 perchloride of mercury in the hot water for the heat treatment rather than the much more expensive organic compound of mercury at present advised, but I do this rather diffidently as I have not tried it. Perchloride of mercury is 1s. 6d. an ounce. One ounce of a saturated solution of mercuric chloride in a gallon of water gives you roughly a 1 in 3,000 solution. HgCl sol. 1/18-1/20 of water.

With regard to stripe or mosaic this is due to a virus, which has recently been proved to be conveyed by an aphid type of insect. Some sorts of Daffodils seem to get it badly and others seem to be practically immune. You can find evidence of it in robust plants, which seem to be able to put up a good resistance and to be practically unaffected by it. Other kinds seem to be relatively susceptible and gradually diminish in size and condition. I think the Daffodils with *maximus* blood are rather liable to it and also those with *triandrus* blood. Some *Leedsii* seem to suffer badly with these, others seem relatively immune, and the same applies to White Trumpets, *Incomparabilis*, *Barrii*, and Poets seem to be relatively immune, as also do Jonquil seedlings. I think that is enough about diseases. They seem to be inventing new ones nearly every year and it is difficult to keep pace with them.

Now I should like to say a word about the preparation of Daffodil bulbs for early forcing. DR. VAN SLOGTEREN and his co-workers have done most of the work on this subject and it is published in the *Daffodil Year Books* for 1933 and 1935. The process adopted is to cool the bulbs from about the middle of July and keep them at a temperature of 48 degrees Fahrenheit for three or four months. Apparently the most effective way is to keep the bulbs at 60 to 55 degrees for a fortnight after they have

been dug up and then keep them at 48 degrees until the beginning of October, when they are planted in boxes, which are kept cool for another four to six weeks, and then, when the boxes are brought indoors, at a temperature of 55 to 60 degrees the flowers develop at a tremendous rate and can be had in flower in good condition in the middle of December. Now this is a very remarkable process because it is apparently quite in contradiction to VANT HOFF's chemical law, which says that for every 10 degrees centigrade rise in temperature the chemical processes are doubled in speed. This holds good more or less for many growth processes in the vegetable world, but here by cooling the bulbs for three months the growth is thereafter speeded up. I think the answer is that Daffodils are naturally plants of temperate to cold regions as opposed to Tulips and Hyacinths (where the vernalization process is, I believe, a heat treatment) and you are practically converting them into Alpines. We know that Alpines apparently go to sleep for six months or so under the snow and that when the snow goes they rush out and flower in a week or two. Apparently root growth is promoted by the cool condition, but the flower bud that begins to form in May, is actually delayed in development by the cooling. DR. VAN SLOGTEREN gives pictures showing the smaller buds in the cool bulbs than in the corresponding controls that have not been cooled. Is it not part of the mystery of rest? We know very little about sleep in animals beyond the fact that the vital processes are slowed up and they awake with renewed energy. Just so, by sending the Daffodil to sleep for four months its growth energy is enormously increased and it rushes into flower with extraordinary rapidity on being awakened. I should like to know what is the temperature gradient of the soil under deep snow. At 6 inches down the temperature might very well be of the order of 48 degrees Fahrenheit. It is, to my mind, a most remarkable process with deep philosophical implications.

I said earlier on that the cult of the Daffodil has led me to another hobby. I expect you know that when we are putting up our Daffodils for exhibition we use moss to steady them in the vases. One day I started looking at the moss and thought I would like to know more about mosses and started collecting them, and after some difficulty managed to get hold of the appropriate literature and so became a bryologist; in fact I have collected 300 different kinds of moss in Devonshire alone, and I find it a most interesting and attractive subject.

One word more and I have done. Many poets have sung about Daffodils. PERDITA says:

“ daffodils,
That come before the swallow dares, and take
The winds of March with beauty ;

WORDSWORTH:

“When all at once I saw a crowd,
A host, of golden daffodils;
Beside the lake, beneath the trees, •
Fluttering and dancing in the breeze.

and

"Ten thousand saw I at a glance,
Tossing their heads in sprightly dance.

and

"And then my heart with pleasure fills,
And dances with the daffodils."

I am afraid the modern Daffodil does not dance. It is more inclined to march and hold its head like a guardsman, or tread a stately measure, and I would put in a mild plea for a more springy neck, especially those for garden decoration. I am inclined to prefer the neck of a Nefertiti to that of a Hackenschmidt or a Sandow.

THROUGH THE SPANISH SIERRAS

Vernon H. Heywood

THE evening air was warm as we climbed the brown road to the crumbling brick piles of Montenegro. Only that morning we had driven through the alpine meadows of the Pyrenees and skirted the blue lagoons of San Sebastian; and now our first night in Spain found us in the wild mountainous country of the Iberian range lying between the old kingdoms of Castile and Aragon.

On this evening in mid-June, 1947, began DR. P. L. GIUSEPPI's last expedition which he had looked forward to and planned during the war years. It may come as a surprise to many people to learn that the Doctor was an ill man before we left this country and the arduous journey he had planned with his usual thoroughness was a gruelling and exhausting experience, demanding of him much courage and determination.

Montenegro was one of those remote Spanish villages to which civilization has spread slowly; the peasants were none too pleased at our arrival and we were offered no hospitality. At the *cantena* there were no beds for us and when it looked as if we would have to pitch our tent in the village street, the local doctor offered us the floor of his house to sleep on.

It was probably due to our host's influence that at first light next morning two guides were waiting with horses to take us up the nearby Sierra de Urbion, an uninviting range of grey mounds covered mainly with a scrub of dwarf Juniper. Above the straggly crops of Barley, *Digitalis parviflora* made a bold splash with its strangely coloured spikes—the diminutive yellow and brown flowers being tightly packed into a snake-like raceme. Sooner than expected we found the endemic *Sempervivum* of the mountain—*S. Vicentei*. Its red pyramids appeared in all the rocky outcrops and screes up to the Pico de Urbion along with *Paronychia argentea*, various *Sedums* and a very dwarf form of *Saxifraga cuneata*. Near the summit grew a tiny silvery *Tanacetum* with cuneate leaves, white rays and black-edged bracts, very reminiscent

of *Tanacetum* (*Chrysanthemum*) *alpinum*. In naming this plant a perplexing problem in taxonomy, which is mentioned later, is involved. Beside the *Tanacetum* the deep-blue flowered *Viola moncaunica* scrambled over the rocks.

On the way to the neighbouring Sierra de Moncayo we found a fine colony of the woolly *Phlomis lychnitis* with its dusky yellow hoods. This showy suffrutescent herb is not so fine, however, as *P. crinita* later seen on the slopes of the Dornajo. Its hoods a well-known collector once described appropriately enough as "toffee coloured."

We were not to know when we drove over a little bridge into the village of Cueva that the bridge was accustomed only to the plodding oxen and *burros*, and that no car had ever penetrated the streets, which were like miniature mountain ranges. This explained the look of horror on the faces of the few watching villagers who were apparently expecting both bridge and car to disappear into the river below. A profitable evening was spent on the lower slopes of the Sierra Moncayo above the village, collecting seeds of *Erinacea Anthyllis*. The Moncayo, known as the moving mountain, due to the loose nature of the rock, has a limited flora. There was no cover on the slaty slopes, where we came across an unusual Foxglove, a dwarf form, none of the plants being over a foot high, with pubescent leaves and large pale purple or pink bells. Though probably no more than a variety of *D. purpurea* it will be quite an asset to cultivation if it retains its pleasing height. Living plants survived the journey by air and are now growing at Edinburgh.

The *Tanacetum* found on this mountain had citron-coloured rays, brown-edged bracts, and was more erect than the plant of the Urbion. These two plants used to come under the general name of *Pyrethrum hispanicum*—a name which hid a multitude of taxonomic sins. WILKOMM in his *Prodromus* applied this invalid name to what is, perhaps, one of the most polymorphic species in Spain, and out of the many forms recognized four—*pulverulentum*, *radicans*, *sulphureum* and *versicolor*. The form *sulphureum* is BOISSIER's *P. sulphureum* which used to flourish so well in the scree at the Royal Botanic Garden, Edinburgh, from seed collected by T. ASHTON LOFTHOUSE. *Versicolor* is BOISSIER's alpine form of *sulphureum* differing mainly in its white ligules. *P. sulphureum* is, *pro parte*, the *Chrysanthemum pallidum* described by MILLER in his *Gardener's Dictionary*, 1768, where he refers it to BARRELIER's Icones 421 (of *Ch. pallidum*) and says it grows round Madrid. *Pyrethrum hispanicum* var. *pulverulentum* is the *P. pulverulentum* Lagasca, a tomentose plant with white ligules. It also is referred to BARRELIER's Icones 421 and is found at Chamartin de la Rosa, near Madrid. This latter plant, with its thick grey tomentum and white rays, and not MILLER's plant, is obviously the same as that figured in BARRELIER's plate and should have the name *Ch. pallidum*. Unfortunately MILLER's name has priority and must stand.

However, the plants are in fact *Tanacetums* and DR. MAIRE made the new combination *Tanacetum pallidum* (Miller) Maire which is now accepted by Spanish botanists *sensu amplo* for *Pyrethrum hispanicum*.

Tanacetum pallidum ssp. *radicans* becomes the new name for the distinctive plant of the Sierra Nevada known previously to horticulture

as *Pyrethrum hispanicum* var. *radicans*. Perhaps the finest of the group, it occurs in the limey debris of the screes where it is easy to perceive its creeping habit, silky lustrous turf and golden ray florets. The ligules tend to turn a reddish tint as they wither but plants raised from seed show much variation in colour, producing all shades from white to gold.

A much more thorough investigation of the polymorphism of the species must be made before deciding the rank to be offered to the many local forms, or topotypes, which occur from the Pyrenees to the Serra Estrella and the Sierra Nevada, many of which are well worth a place in the scree. As FARRER says of *Chrysanthemum hispanicum* " . . . in all its forms it is a treasure to be much desired."

Stretching south beyond the Iberian mountains, the treeless plains of Old Castile did not invite us to linger. The next mountain on our programme was the Albarracin, but the swirls of thick white dust that our car made on the road to it, forced us to turn back.

The high tablelands of the Meseta occupying the mass of central Spain are not ideal for the plant collector in summer; in this region of hot days and clear skies with a sudden drop in the temperature at sundown, the vegetation is extremely sparse and poor, but the flora of the central sierras which divide the Meseta is exceedingly varied and interesting. Here the Sierra de Gredos reaching 8,731 feet is one of the few peaks in Spain glaciated during the Pleistocene.

The richest source of garden plants is the south and south-east of the peninsula which is largely occupied by the massive formation of the Baetic Cordillera attaining 11,421 feet in the Mulhacen, the highest point of the Sierra Nevada. In these Cordilleran ranges are found many of Spain's estimated 1,300 endemic species, a considerable number of which are relics of the flora of preglacial Europe surviving in refugia, thus showing a remarkable parallel with the Balkan peninsula flora.

One of the most promising and least known of these ranges is the Sierra de Cazorla in the province of Jaen. The flora as far as it is known parallels that of the nearby Sierra Magina which harbours nearly 200 of Spain's endemics out of a total flora of less than 1,000 species.

Disturbing its peaceful life, we descended one morning on the little township of Cazorla. This over-grown village lies in a hollow surrounded on three sides by a landscape of Olives, their dull green leaves and gnarled grey stems arranged in orderly rows almost eclipsing the brown sandy soil, and on the fourth by the limestone peaks of the Sierra. "Sierra" refers not only to the mountain chains but to the whole of the wild uncultivated part of the community's land. It is part of the enormous massif known according to tradition as the Mons Argentarius lying between the Sierra Morena in the north and the S. Nevada in the south, and consists mainly of three ranges of crests beyond which to the east lies a sea of bare and arid mountains.

Somewhere on the rocky slopes above town at the Cueva de la Magdalena we knew *Pinguicula vallisnerifolia* grew, and followed by a procession of the curious townsfolk we began our search. Fragrant Labiates lined the way—*Lavandula Stoechas* and *L. latifolia*, the silvery *Teucrium capitatum* and *Ballota hispanica* (= *Ballota hirsuta*). A new

slender yellow-flowered *Linum* appeared occasionally and in the sunny rock was seen *Arenaria armerina* (*armeriastrum*) *elongata*, a neat forest of slender brown stems with tiny obtuse, slightly revolute leaves topped by masses of small white stars. It is hard to believe that the plant belongs to the same species as the low compact imbricate-leaved mounds of *Arenaria armerina frigida* of the Sierra Nevada screes. Of the many Spanish Foxgloves, the one found here, *Digitalis obscura*, is perhaps the finest. Almost a sub-shrub, its woody stems bear narrow dark green straps of leaves and the flowers are fiery orange. *Trachelium coeruleum* formed great blue masses on the sandy banks. We passed several small waterfalls almost dried up and there seemed little hope of a moisture-loving *Pinguicula* surviving in these conditions, but over the grey vertical cliffs above the Cueva de la Magdalena poured a welcome torrent into a stream. Luxuriating in the moist heat, *Pinguicula vallisnerifolia* draped the mouth of the cave and surrounding rock faces with green curtains of long limpid ribbon-like leaves. These leaves, often about 12 inches long, are fantastic, quite a botanical nightmare, hanging down in bunches, and the long-spurred flowers are exceptionally large and blue. Reproduction by little offsets, unexpected in the genus, explains the compact growth; possibly in such a specialized habitat the seed-producing habit has been, to a large extent, lost. A search made for seed later was fruitless, for any seed set must have been dislodged by a hail-storm which broke nearly every window pane in Cazorla. The problem of introducing this giant Butterwort is rather formidable, for the carefully packed sticky ribbons we sent back by air shrivelled into powder. It produces an even more difficult phytogeographical problem, as this *Pinguicula*, which would look more at home among the tropical *Utricularias* is found quite unaccountably in one locality only in this southern Spanish range (Fig. 96).

Over an hour was spent in the evening arguing and haranguing with peasants about the price of donkeys, but next morning, the first of July, the animals were waiting for us, already burdened with sacks filled with cartwheel loaves of bread, for our guides had no intention of going hungry.

Past an *anise* distillery and through picturesque Iruela, we took to the mountain track stopping to collect the softly hairy *Campanula mollis* covered with charming light-blue bells. The plant of the Cazorla is the variety *giennensis* differing by having greener, less tomentose leaves which are quite entire.

At about 5,000 feet on Cerro Gilillo *Viola cazorlensis* covered the limestone rocks (Fig. 95). Barely a shrub, its grey root stock sends up slender pink stems covered with Juniper-like leaves from whose axils long stalks arise bearing each one exquisite flower of purest pink. The spurs of the scentless blooms surpass in length even those of its sister species *Viola delphinantha*. Essentially a connoisseur's plant, *V. cazorlensis*, with the related Balkan species *V. delphinantha* and *V. Kosanini*, represent a unique development in the genus, being descendants of an ancient Tertiary stock. *Viola cazorlensis* seems happiest in cultivation when wedged between limestone blocks. A plant raised by MR. W. E. TH. INGWERSEN from seed collected by DR. GIUSEPPI won an

Award of Merit at the Chelsea Show in 1936. Seed from this year's collection has now been distributed and we hope to see more of the *Viola* in the near future.

The forests of the Cazorla are mainly pine—the fragrant black Pine, *Pinus Pinaster* and the “Salgareno” *P. pyrenaica* ssp. *Laricio* (*Pinus Laricio* Poir.) predominate, but occasionally one comes across a relict stand of *Quercus lusitanica*.

In a sunny clearing we were surprised to find the giant spikes of a *Verbascum* in full flower. The goats have a particular liking for its twinkling yellow flowers and thick woolly leaves and with the help of a parasitic insect ensure the early death of this plant. The species is not yet identified, but is not the Cazorlan relict *V. Hervieri*.

After lunch on the banks of the Guadalquivir which rises in these heights, we rode over crests and wooded slopes into plains covered with seeding mounds of *Ptilotrichum spinosum*. A wide expanse stretching in front of us was the Maleza where the pines give way to a scrub of *Cistus*, *Ulex*, *Phillyrea*, *Lentiscus* and *Quercus coccifera*.

Nightfall brought us to the Fuente de la Umbria where the fountain was reputed to be the finest in the Sierra. *Pinguicula vallisnerifolia* had been reported from here by LACAITA but of the fountain and the *Pinguicula* there was no sign. Our guides proudly pointed out the “fountain”—a crystal stream of water gushing from a pipe into a stone trough.

We found the third great rarity of the Sierra, *Ptilotrichum* (*Alyssum*) *Reverchonii*, in the terrifying gorge of Los Organos dominated by the organ-pipe pinnacles (Fig. 94); the *Ptilotrichum* was on the vertical cliffs at the bottom of the gorge and we were at the top with a thousand feet of space in between. Leaving the men to their siesta, I followed my guide on a gruelling pilgrimage in the full sun up a nearby peak to the only track which led to the bottom of the ravine. Down in the river-bed formed by the cascading torrents of a waterfall, the silvery leaves and black root stock of the crucifer were a tantalizing sight, out of reach on the limestone walls. Good alpine nails and an old branch won the day for a few fruiting heads were dislodged. *Ptilotrichum Reverchonii* forms quite a small shrub and the grey stems are bare but for the terminal rosettes of spatulate leaves covered with a silvery indumentum of star-like hairs. The flowers borne in ample heads are fat and white and the general effect is striking. The Abbé Hervier summed up the distribution of this plant when he wrote on the herbarium sheets “c'est assurément la plante la plus rare et la plus nouvelle de l'Espagne.” *Ptilotrichum pyrenaica*, the only related species, is even more exclusive growing in the Pyrenees on a pinnacle at Sellier—“unicus locus totius mundi.”

We crossed El Nava de l'Asno (lit. the donkey's navel), a long wide depression, bare but for seeding mounds of *Ptilotrichum spinosum* and *Erimacea Anthyllis*. Above towered the grey sun-baked inner range, the Sierra de la Cabrilla, comparatively naked of forest. In a blazing sun we rode up the track to Las Empanadas, the summit, 2,106 m. Leaving our donkeys, we scrambled up the loose rock to the highest point of the Cazorla from where a sea of mountains stretched into the vague distance. Enormous red withered clumps covering the white

rock were *Saxifraga Rigoi*, one of the Gemmiferae. To all appearances it gives up the struggle against the Spanish sun and drought, but hidden in the dried up leaves are tiny green buds; the flowers recalling *S. geranioides* are large and snow white. *Erodium trichomanifolium* was flowering happily in the limestone crevices.

Occasionally we met outlaw families living in caves or brushwood huts; they were quite friendly people and would watch us, politely wondering, for we must have looked a strange sight down on our knees digging out plants. I was feeling none too well after sampling our men's dish of *Miga*—crumbled bread fried in olive oil—as we made our way down again to Cazorla. *Viola cazorlensis* appeared once more, and this time my guide entered into the spirit of things and tore off handfuls of flowers, thrusting them at me till my donkey was almost hidden under garlands of the priceless blooms.

In Albaladejo, at the base of the Sierra de Magina, there was no shelter for the car but the old woman in the *fonda* invited us to drive into the kitchen: it had no door; many of the village folk were round the fire; a girl with a couple of goats was buying wine; and a goodly population of assorted livestock occupied one corner. Our small car made little difference with its bonnet jammed up against the stair.

The Sierra de Magina, like the Cazorla, is mainly limestone and the lower rocks were covered by the almost prostrate *Rhamnus Alaternus* var. *prostratus*—the *R. myrtifolius* of WILKOMM, covered with red berries. Nearby we saw the curious glaucous spiny umbels of *Bupleurum spinosum*. In the scree, further up, the tiny rosettes of *Globularia spinosa* were difficult to see—the dulled silver of their leaves merging with the grey rock. A rare find was *Saxifraga Camposii*, a variable plant with very long flowering stems.

South in Granada, the heat was so fierce that we stayed a night in the old Convent of San Francisco, in the grounds of the Alhambra, that fabulous Moorish palace situated on cooler slopes above the town. The convent gardens, flamboyant with *Lilium candidum* and *Salvia splendens*, were beautifully kept; *Plumbago capensis* and Bougainvillea excelled on the walls and the terraces were lined by fruiting figs. Above Granada, the Sierra Nevada raises its ice-capped peaks. Travelling up by car we were transported in a few minutes from the city's shady groves to a land of mountains whose tremendous slaty slopes of debris sweep down to the roadside. *Digitalis nevadensis*, a smaller and more refined variety of *D. purpurea*, followed us all the way to the highest *albergue* at 9,000 feet, just below the Peñons de San Francisco.

The scree stretching in front of the inn simply cried out for the trowel; there was *Dianthus brachyanthus*—the forma *nivalis* much more compact than the over-grown-looking forma *montana*; the symmetrical mounds of *Arenaria tetraquetra* var. *granatensis*; in the slate the creeping stems of the golden *Tanacetum pallidum* ssp. *radicans*. *Anthyllis Vulneraria* ssp. *Webbiana* var. *nivalis* (*A. Webbiana*) looked particularly fine with its grey leaves and crimson pea-flowers. Below a bank of melting snow the water soaked ground was covered with thousands of silver stars glistening in the sunlight—the silky leaves of *Plantago nivalis*, *estrella de la nieve*, star of the snow. Almost equally abundant

was *Viola nevadensis*, a charming species with rounded leaves and faces of wedgewood blue.

The Picacho de Veleta, 11,385 feet, the second highest peak, was surrounded by virgin expanses of snow which we had no time to cross. *Sempervivum nevadense*, unusual in bearing flowers in the axils of the upper leaves, was often present in the crevices, and the spiny shoots of *Eryngium glaciale* were late in budding. *Ptilotrichum spinosum* was here in full flower unlike the seeding hummocks of the Sierra de Cazorla, but a much rarer beauty was *P. purpureum*, its thornless stems tipped with rose-pink flowers barely peeping above the slate. A yellow-stained *Teucrium* was frequent, clashing with the fragrant pink mounds of *Thymus granatensis*. *Erysimum australe* var. *alpinum*, an attractive yellow flowered crucifer, caused some speculation as to its identity.

Another day took us to the Mulhacen, 11,421 feet, the highest peak. We had not gone far when the moraine was covered with the large white cups of *Ranunculus acetosellifolius* borne erect above its sorrel leaves. Nearby, dotted about the mossy slopes, were the purple corollas of *Pinguicula leptoceras*, a species found also in the Balkans.

Though *Ranunculus demissus* var. *hispanicus* with its finely dissected leaves may not be a first-class plant for the garden, it was a wonderful sight when massed in thousands. Its yellow flowers are smaller than *R. demissus* itself from the Eastern Mediterranean and BOISSIER believed that the Atlas produced this species. Recent geological changes in North Africa would account for its present discontinuous distribution. A third species, *Ranunculus alismoides*, surpassed the others by its sheets of purest white. This delightful variety of *R. angustifolius* raised a miniature forest of dark green pointed leaves through the gently flowering water seeping from the melting snow.

Over spongy slopes we reached the Laguna de las Yeguas hemmed in by snow sheets. Round the lake margin the light streaked chalices of *Gentiana alpina* were abundant. After a picnic lunch of ham, sausage and "marmalata," friend HERBERT COWLEY and I set off with a guide to look for the famous manzanilla (*Artemisia granatensis*), that aromatic Composite much sought after by the shepherds who use it to make liqueurs and flavour wines. Far above the lake we had found only one poor specimen, and, stuffing mossy Saxifrages* into the collecting bag, we were about to descend to the lake again when three ruffians armed to the teeth jumped out from behind a rock. Leaving our guide to parley for our lives, we pored over our plants; but it was useless—we were held up. A drawn revolver and open knife prodding one in the back in no uncertain manner cannot be ignored. Fortunately SIR WILLIAM WRIGHT SMITH had given me a letter of introduction in Spanish which I hastily produced. Apparently mountain bandits in Spain read backwards for I received an impressive welcome as the Regius Keeper of the Edinburgh Royal Botanic Garden! COWLEY managed quite well too; he produced a visiting card and created the impression that he was a count. Some of our few remaining English cigarettes helped matters

* *S. pubescens* subsp. *nevadensis*, the densely caespitose forma *typica*, though here atypical with pink flowers, and the more lax forma *pulchella*, both perhaps better known as *Saxifraga nevadensis*.

and we were presented by a safe-pass beginning "We know by the tobacco they smoke that these are English gentlemen." A glass of anise when we reached the inn that evening was never more welcome.

From the shaded groves of Granada we drove north to the sub-tropical coast luxuriant with Agaves, Opuntias, Aloes and Capparis.

Beyond the palm-lined avenues of Almeria, the landscape was bare—sun-burnt hills stretched for miles with occasional towns of sun-baked brick, the same dusty hue as the ground, perched precariously like stony outgrowths on the edges of ravines. The whole scene was reduced to a weird and gloomy tone of brownish grey. In this barren country we reached Librilla from where we drove to Casas Nuevas to climb the Sierra Carrascoy.

It was pleasant walking up the slopes through groves of Olives and Almonds, and the long hanging bunches of the locust bean (*Ceratonia siliqua*). In dried up stream-beds the Oleander made a garish splash of colour. Above the groves *Thymus murcicus* was in fruit; unknown to cultivation this thyme of the Pseudothymbra section is very similar to the handsome *T. membranaceus* and can scarcely be separated from it. *T. membranaceus* shows considerable variation in the form and covering of the leaves. The specimens of *T. murcicus* from the *locus classicus* and those from the Sierra Carrascoy are practically identical with BOISSIER's type gathering of *T. membranaceus*. If, therefore, a name is to be applied to any of the variants it should be given to those plants from Murcia which differ from BOISSIER's plant in having much more revolute leaves and a dense greyish white indumentum of minute glandular hairs. Another variation is in the colour of the bracts: some of the plants of the Sierra Nevada and most of those at Velez-Rubio are marred by pink tinged bracts and closely resemble atypical specimens I have seen of *T. longiflorus* differing only in not having purple corollas. At the other end of this range of variation, *T. longiflorus* can have intense purple bracts. One might well be excused in thinking that there are more names than distinct species. Incidentally, it would be good to see more of these Pseudothymbra thymes in cultivation.

Outside San Miguel de Salinas on a sandy hill we found another thyme of this section: the leaves were those of the rare *Thymus Funkii* but the bracts and flowers are like *T. longiflorus* though somewhat smaller. Plants raised from seed are now thriving. The only other plant in flower seen here was the orange *Odontospermum maritimum*.

Jativa was disappointing. After climbing the castle hill before breakfast one day, we could find no trace of the elusive bulb *Lapiedra Martinezii* which sends up its flowers in August.

From Jativa to Valencia and into the Catalanian hill country we reached Igualada where we joined the pilgrimage to the jagged pinnacles of the Montserrat. The rocky sentinels, fantastic rock formations of this grotesque mountain with their summits shrouded in mist, are an unforgettable sight. Above the monastery of the Montserrat, the funicular railway takes you to the height where, on the hard basalt, the white crusted rosettes of *Saxifraga catalaunica* abound with *Erodium supracanum*, and *Ramondia Myconi* forms great scabs beyond the box woods.

From the high ridges, the view stretches to the massive barrier of the Pyrenees hiding the green fields of France; a day's pleasant drive to La Junquera and our short journey through Spain was over.

NOTES FROM FELLOWS

Rhododendron Souliei

GROWING in a valley at the foot of the main glacier of Mount Mi-nyag dGangs-dkar (pronounced Minya Ganka) at an elevation of over 12,000 feet. Minya Ganka itself is 24,900 feet in height. *R. Souliei* is fairly common in the valleys around Minya Ganka and reaches its best development around 12,000 feet. Its flowers are of rich pink and very showy as the photograph testifies. It grows to a height of 12 to 18 feet, and is associated with Scrub Oak (*Quercus semicarpifolia*). It prefers well-drained slopes in the immediate neighbourhood of the Minya snow range. The latter extends from north to south and is composed of over fifty snow peaks of which the lowest is about 19,000 feet, while others reach heights of 21,000 to 23,000 feet, culminating in the granite pyramid of Minya Ganka, 24,900 feet. It is not found in valleys west of the snow range. The building in the background is a Karmapa Lamasery, called Ganka Gomba. The lamasery is only accessible for about five months in the year. The only pass leading to this valley is seven days south of Ta-chien-lu, now called K'ang-ting, known as the Tse-mi La, which is over 15,000 feet in height (Fig. 89).

J. F. ROCK

Magnolia Wilsonii at Quarry Wood

The specimens shown in the Tree and Shrub Competition at the Chelsea Show were taken from a plant raised from seed sent in 1939 by MR. ARMYTAGE MOORE from his garden "Rowallanc," Co. Down. When sending the seed he stated it was taken from an exceptionally fine form of *Magnolia Wilsonii*.

Consequent upon doubts being raised recently concerning the name, further inquiry has been made, and MR. ARMYTAGE MOORE now tells me he has a large flowering tree of *M. sinensis* growing near to his *M. Wilsonii*. It therefore may well be that the flowers shown are of hybrid origin.

The plant of *M. Wilsonii* at Quarry Wood is now 11 feet in height and 10 feet in width (Fig. 97).

W. BENTLEY

Lysichitum camtschatcense

Readers may be interested to learn that this plant, so ably described by MR. N. K. GOULD in the JOURNAL for April, has hybridized in this garden with *Lysichitum americanum*. There may be no more than assumption to support that statement, but having grown both species for many years, and seen them naturalized by self-sown seed, without ever discovering any departure from the type in one or the other, the occurrence

of two seedlings quite unlike the typical white or yellow certainly seems to suggest that they are the result of a cross. One of these seedlings has spathes the colour of a primrose, the other one being a wan ivory. Incidentally, I may add that there appears to be more than one form of *L. camtschaticense*, for while the spathes of our original plant (which must be about 20 years old) are fully as large as those of *americanum* at its best, plants imported from Japan just before the war are considerably smaller in the flower. Indeed, they look comparatively puny compared with the older specimen.

A. T. JOHNSON

BOOK NOTES

"In Your Flower Garden." By Stanley B. Whitehead. 116 pp. Ill. (J. M. Dent & Sons Ltd.) 6s. *od.*

In twenty chapters the author ranges over most garden subjects, from path making, trees and shrubs, lawns, bulbous plants, rock and wall gardens, house and window-sill plants, etc.

Covering such a wide field it is inevitable that some of the chapters are too short to deal fully with their particular subject. Nevertheless, the author has in the space at command managed to give a surprising lot of useful information, especially to the beginner. In the first chapter he rightly stresses the importance of planning on paper the layout of the proposed garden. There are useful tables of plants for various purposes, including trees and shrubs, deciduous and evergreen, hedges, herbaceous plants, rock and scree gardens, annuals and biennials, hedges, etc.—the height and spread of plants, soil, situation, flowering period and other useful information being given.

In many cases more detailed information would prove useful for the beginner. For example, no details of *Acer* being given, simply *Acer spp.*; there are many such examples, such as: *Forsythia spp.*, *Berberis spp.*, *Abies spp.*, etc. Again, in many cases only the generic name is given without any indication of the best species or varieties to grow.

There are a number of good illustrations and line drawings.

J. COURTS

"Michaelmas Daisies and Garden Asters." By E. R. Ranson. 123 pp. Illus. (John Gifford, Ltd.) 6s. 6d.

This little book contains much condensed information on the subject "Michaelmas Daisies and other species of Asters" popular in our gardens and will be welcomed by many who desire to increase their knowledge of these useful plants so prominent as border plants in the late summer.

The author has not confined himself entirely to those plants to which the name "Michaelmas Daisies" is applied, but has divided his book into chapters devoted to the *Arnica* section of *Aster* as well as to the species of the genus which on account of their dwarf habit are usually considered as more suitable as plants for the Rock Garden of which the beautiful *Aster yunnanensis* "Napsbury" may be quoted as an example.

There are in the book 23 chapters embracing information on the History, Descriptions, Propagation and general information, as well as notes on the general cultivation. Space is given for notes on Diseases and Pests to which the plants may be subject, giving treatments recommended for their prevention or destruction.

The photographs, 28 in number, are well produced and grouped together while as a frontispiece a border devoted to Michaelmas Daisies is well portrayed.

R. L. HARROW

"Vegetable Growing." By J. S. Shoemaker. 506 pp. Ill. (Chapman & Hall.) 27s. *od.*

The author states that this book is a treatise which applies research findings to successful vegetable growing, and he is to be congratulated on the amount of interesting information and data which he has been able to bring together.

A short history is given of most vegetables, together with the names and descriptions of the leading varieties in cultivation at the present time, with particulars of their introduction. Various methods of cultivation and the use of fertilizers are well explained.

Additionally, as a result of scientific research, many interesting points are explained which often puzzle the average grower. One of these is how the deep colour in sorts of Carrots, so much desired by the grower, is developed or retarded by differing degrees of temperature by day or night during the growth of root. Another point explained is why even good stocks of Celery sometimes bolt to seed instead of developing stems.

The book is written chiefly for the American grower on Vegetables much in favour in that country, such as Sweet Corn, Pumpkins or Musk Melon, Lettuce, Tomatoes, Cabbage and Sweet Potatoes, which are dealt with at considerable length. Nevertheless, much of the information will equally interest the up-to-date British grower, especially if he adapts it to conditions in this country. By this I mean that although on page 224 it states: "the most popular leaf Lettuce for greenhouse culture is Grand Rapids," it does not follow that this is the most popular variety in this country.

Again with Cabbages—all the types referred to are those specially suited for Spring sowing, either in America or in this country. Varieties used for sowing in the Autumn in this country for the production of heads in the Spring are apparently not used in America.

On page 273 a table is given showing the number of chromosomes in varieties of Kale and other Brassicas. Types of *Brassica oleraceae* have 18 chromosomes, but amongst the list appears 'Ragged Jack' Kale. This is a very old type, seldom seen during the past fifty years, and is really a laciniated form of the Asparagus or Rape Kales. I think this should be included in the table of 38 chromosomes. It may be that the true original 'Ragged Jack' has been lost to cultivation.

The sixty pages devoted specially to vegetable seed production have greatly interested me, as for over fifty years I was engaged in vegetable seed production and annually examined many thousands of vegetable trials. A lot of the information given I have never seen in print before, and it gives an excellent idea of the amount of care and observation which are necessary to produce high-class seed.

The author sets great value on the importance of good and pure stocks, with which I entirely agree. I would, however, if anything be even more severe in certain cases than he is as to what constitutes a really good stock.

I do not think the best British Carrot growers would be very pleased if they found one white or wild plant in every 500 roots in their crops of red Carrots and they would certainly complain if they found 5 per cent. roots of another variety in their Beet crops.

However, there is much valuable information in this section and I can well recommend the book to students, and even the best-informed growers would certainly find much to interest them.

WALTER F. GILES, V.M.H.

"The Cultivated Species of *Primula*." By Walter C. Blasdale. 284 pp. Illus. (University of California Press. Available through Cambridge University Press, London.) \$7.50.

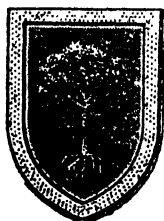
For more than twenty years Professor Blasdale has been devoted to *Primulas*, many of which he has grown successfully in Berkeley, California. Of considerable interest in this book are those pages dealing with the *Polyanthus*, the *Auricula* and development of the various forms of *P. malacoides* and *P. obconica*; because Professor Blasdale is primarily a chemist his remarks on such aspects of the subject as farina and primula poisoning are both interesting and illuminating. Unfortunately the accuracy of the remainder of the book is not up to this standard and it is impossible to recommend for general purposes a book so littered with errors as this one. These are errors in nomenclature, allocation of species to sections, records of cultivation in this country and dates of origin, discovery, introduction and description. The book is lavishly illustrated.

"Herbs and How to Grow Them." By Mary Thorne Quelch with drawings by Mildred E. Eldridge. Cr. 8vo. 280 pp. (Faber and Faber.) 8s. 6d.

This little book deals with Herbs in the very widest herbalist sense, rather than in the strict, botanical meaning of the word, since it includes trees and Algae. There is much interesting lore in it and many useful receipts which will interest the housewife as much as the gardener. Unfortunately no cultural details are included.

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Part 9

September 1948

THE SECRETARY'S PAGE

Programme of Meetings—The following Meetings with Shows will be held during the months of September and October:—

- { Tuesday, September 7—12 noon to 6 P.M.
- { Wednesday, September 8—10 A.M. to 5 P.M.
- { Tuesday, September 21—12 noon to 6 P.M.
- { Wednesday, September 22—10 A.M. to 5 P.M.
- { Tuesday, October 5—12.30 P.M. to 6 P.M.
- { Wednesday, October 6—10 A.M. to 5 P.M.
- { Tuesday, October 19—12 noon to 6 P.M.
- { Wednesday, October 20—10 A.M. to 5 P.M.

Competitions—There will be three competitions for amateurs at the Show on September 7 and 8, a Cactus and Succulent Competition, a Plum Competition and a Flower Arrangement Competition. In connection with the Autumn Fruit and Vegetable Show on October 5 and 6 there will be a Flower Arrangement Competition for professional florists. Particulars of these Competitions may be obtained from the Secretary, Royal Horticultural Society, Vincent Square, S.W. 1.

In conjunction with the Show on September 7 and 8 the Alpine Garden Society will hold a competition in the Old Hall, particulars of which may be obtained on application to the Secretary of the Alpine Garden Society, MR. C. B. SAUNDERS, Husseys, Green Street Green, Farnborough, Kent. There will also be a Fuchsia Competition in the New Hall on those days and schedules may be obtained from MR. H. W. SCARLES, Hon. Secretary of the Fuchsia Society, 19 Broadway Avenue, Twickenham, Middlesex.

Lectures—The following lectures will be held during September and October:—

September 7—"Ornamental Grasses" by MR. C. E. HUBBARD.

September 21—"Spraying in the Fruit Garden" by DR. A. M. MASSEE.

October 5—"Old Varieties of Apples" by MR. P. MORTON SHAND.

October 19—The second Masters Memorial Lecture "Nutrition Problems connected with Horticultural Plants, with special reference to Trace Elements" by PROF. T. WALLACE, C.B.E.

Demonstrations at Wisley—The following demonstrations will be held at Wisley during September and October:—

Vegetable Garden

Wednesday and Thursday, September 15 and 16—Harvesting and Storing (2-4 P.M.).

Wednesday and Thursday, October 6 and 7—Digging, Trenching, Manuring and Composting (2-4 P.M.).

In both cases the demonstration given on the second day will be a repetition of that given on the first.

Kindred Societies' Shows—The National Dahlia Society is holding a Show in the Old Hall on Tuesday and Wednesday, September 14 and 15. The National Chrysanthemum Society will hold a Show in the New Hall on September 14 only. On Friday, September 17, the National Rose Society is holding its Autumn Show. The Royal Air Force Horticultural Show is being held in the Old Hall on Tuesday and Wednesday, September 28 and 29. Fellows' and Associates' tickets will admit to all except the National Chrysanthemum Society's Show.

Examinations for the National Diploma in Horticulture—The written parts of the Examinations for the National Diploma in Horticulture were held in April and the practical parts in June. At the Preliminary Examination there were 116 candidates, of whom 48 satisfied the examiners that they should be allowed to proceed to the Final Examination if or when they have been engaged in horticulture for the requisite six years. Forty-nine candidates presented themselves for the various Sections of the Final Examination, and the National Diploma has been awarded to twenty of them as follows:—

Section I—*General Commercial Horticulture*

MISS B. D. ALLEN
MR. S. O. CRAZE
MR. J. H. GLAZEBROOK
MR. A. H. LUGG
MR. R. K. MOWFORTH

Section II—*Fruits in the Open*

MR. C. E. ARMSTRONG
MR. F. G. BAUR
MR. E. C. HERWIN

Section III—*Vegetables in the open, in frames and under cloches.*

MR. C. P. QUARRELL
MR. R. W. RENNISON

Section V—*General Horticulture*

MISS D. M. AGAR
MR. K. D. BUTTERS
MR. A. R. CARTER

Section V—*General Horticulture—cont.*

MISS W. M. DULLFORCE

MR. F. J. HEBDEN

MR. J. MCTIERNAN

MR. C. NORTH

MISS N. M. SMITH

MISS N. R. SPILLER

Section VIII—*Public parks, grounds and open spaces*

MR. J. S. MASTERTON

1948 Examinations: National Certificate in Elementary Horticulture—The written examination for the National Certificate in Elementary Horticulture was held in June, and the practical parts during June and July. There were 192 candidates, of whom 55 passed in Division I and 129 in Division II.

Publications—Part III of Volume 165 of the *Botanical Magazine* will be published early in September. All enquiries for this publication should be addressed to the Secretary of the Society.

Lindley Library—The Lindley Library will be closed for re-organization for the week beginning Monday, September 13, 1948.

WISLEY IN SEPTEMBER

THIS month will show fewer flowers in the Gardens, but coloured foliage and ripening fruits are appearing in many places, and the trials of Dahlias and Chrysanthemums are now at their best.

Beneath the South wall of the Laboratory a large group of *Amaryllis Belladonna* is in full flower with numerous pink trumpets carried on stout stems above the leafless bulbs; across the lawn, *Nerine Bowdeni* will be producing flowers of a similar colour later in this period.

Many of the climbers noted in previous months continue to brighten the walls, while new displays are started by the spiny, white-flowered *Colletia armata* and *Clerodendron foetidum*. The latter is generally more herbaceous than shrubby at Wisley, but new growths arise from ground level each year and terminate in tight heads of pink flowers before severe frost intervenes and reduces the plant again to ground level.

In the shrub border beyond the brick arch another species, *Clerodendron trichotomum*, forms an attractive small tree covered with sweetly scented white flowers followed by blue fruits; it is an extremely valuable garden plant as few trees flower at this time of the year, while its small size makes it easy to accommodate.

With the shorter days, increasing interest is shown in the glass-houses. The Half-Hardy House contains several fine groups of Nerines planted in well-drained beds; *N. flexuosa* is generally the first to flower in company with the fine-leaved *N. filifolia*, soon to be followed by the Jersey Lily, *N. sarniensis*. *Calceolaria Pavonii*, trained to the roof supports, is producing masses of yellow flowers, while the tall, white,

purple-blotched spikes of *Acidanthera bicolor* var. *Murielae* rise from the beds with the magenta of the South African *Oxalis Bowiei* at a lower level. *Fuchsia microphylla* and the Abutilons continue a display that has lasted all summer, while *Lithospermum rosmarinifolium* produces a succession of vivid blue flowers that will cheer us the whole winter through.

The Temperate House also contains a varied collection of flowering plants; in the centre bed, *Tibouchina semidecandra* is clothed in silvery-green foliage and royal purple flowers, while the rampant growing *Buddleia asiatica* carries numerous fragrant white sprays; here also the giant Dahlia, *D. imperialis* grows vigorously but rarely produces its pink blossoms, as the roof glass is generally reached before these appear. *Malva umbellata* forms a small tree with many sprays of crimson blossoms appearing over a long period. On the side benches, *Diplacus glutinosus*, *Bauera rubioides*, and the earliest *Nerine* hybrids contribute to the display.

Beneath the wall bordering the frameyard, *Ceratostigma Willmotianum*, *Ceanothus* 'Henri Defosse' and the Belladonna Lilies form a pleasing combination of blue and pink, while the last orange-yellow bells are appearing on *Fremontia mexicana*.

In the Award of Garden Merit Collection, *Anemone japonica*, *Chrysanthemum rubellum*, *Sedum spectabile* and *Salvia uliginosa* are outstanding amongst the herbaceous perennials. In the shrub borders, *Fuchsia magellanica* var. *Riccartoni*, *Caryopteris* \times *clandonensis*, *Perowskia atriplicifolia* and *Hydrangea paniculata* are all in full flower, and on the small rock garden near the pond the golden-yellow crocus-like flowers of *Sternbergia lutea* and the blue trumpets of the Gentians warn us that autumn is approaching.

Before passing to the Herbaceous Borders the Viburnum collection is worthy of a visit, as several species are particularly fine when in fruit. *V. betulifolium* with hanging masses of red berries, *V. lobophyllum*, with numerous clusters of glistening crimson, and the apricot-yellow of the variety *xanthocarpum* of our native *V. Opulus* are outstanding.

The Herbaceous Borders are still filled with colour; many of those plants mentioned in previous notes are still in flower while Michaelmas Daisies, Solidagos and the taller Rudbeckias, together with *Physostegia virginiana* var. 'Vivid,' add fresh blooms to the display.

In Seven Acres, *Berberis* fruits in many shades are ripening everywhere, and brilliant foliage decks many *Euonymus* and *Cornus*; the Heath Garden has some fine groups of *Calluna vulgaris*, including the double pink form 'H. E. Beale.' Many of the purple Crab Apples are carrying heavy crops of ornamental fruit, and near the entrance to the Pinetum large drifts of *Colchicums* are carpeting the ground with mauve and white.

The Wild Garden has few flowers to show; *Gentiana asclepiadea* still blossoms in shady corners, and groups of *Cyclamen neapolitanum* form a charming picture in pink and white on the borders of the dry dyke, but amongst the shrubs flowers have given place to autumn foliage; the rich crimson-purple of *Disanthus cercidifolius* is conspicuous,

while columns of yellow or crimson *Enkianthus*, low dark green masses of *Pernettya mucronata* with fruits of many shades from white to crimson, and oak leaves turning golden brown overhead all help to make the scene one to be remembered until spring comes again.

The Rock Garden contains many autumn-flowering *Gentians*, including *Gentiana sino-ornata*, the sky-blue *G. Farreri*, *Macaulayi* and several other hybrids of recent introduction. Another genus prominent at this period is *Polygonum*, of which several easily grown species are valuable for their pink or white flowers. The prostrate *P. vacciniifolium* produces numerous spikes of pink, above small deep green leaves which turn to crimson as the autumn advances; others flowering here are *P. Reynoutria*, and the bright pink *P. affine*. Near the Alpine House, the first *Crocus* species will be in bloom towards the end of the month, while in the house several pans of late *Campanulas*, *Amaracus Dictamnus* with hanging spikelets of pink flowers, and several *Sedums*, will be found in flower.

The long Rose Borders are now producing their second crop of flowers, and while the annual border is a little past its best, the double border of *Zinnias* and the round bed of French and African *Marigolds*, amongst the bush *Pears*, will still be in full flower. Near the small archway through the Hornbeam hedge will be found a bed of *Chrysanthemum* species, the beginnings of a National Collection to be housed at Wisley. On the Floral Trial Grounds, early flowering *Chrysanthemums* and *Dahlias* are at their zenith and all interested in these flowers should endeavour to visit the Gardens during the month. The large trial of *Marigolds* and *Tagetes* has been in flower for some months but the plants are still neat and form sheets of gold and crimson now that they have filled all their allotted space between the rows.

CORRIGENDUM

Volume LXXIII, Part 7, July 1948.

SOME NOTABLE PLANTS IN CORNISH GARDENS

Figs. 74 and 75. It is regretted that owing to an unfortunate transposition, it was stated that the plant of *Magnolia mollicomata* was killed in the winter of 1947. This remark should have applied to the plant of *Leptospermum eximium* reproduced as Fig. 75. The photograph of *Magnolia mollicomata* was taken in early April 1947, after the winter, in MR. G. H. JOHNSTONE'S garden at Trewithen.

ROCK GARDEN PLANTS

W. E. Th. Ingwersen, V.M.H.

*(Report of a lecture given in June 22, 1948, MRS. V. HIGGINS,
M.A., F.L.S., V.M.H., in the Chair)*

I HAVE been requested to talk to you about rock plants which retain their hold on our interest in spite of wars and difficult after war times. In fact, I might say they are increasing their hold as they are so eminently plants for the owner gardener rather than for the hired gardener's attention. Moreover, being small even the restricted post-war garden can accommodate a really extensive collection of these plants, which with their varying flowering periods and their often delightful cushions and mats of frequently evergreen foliage engage our attention and admiration throughout the seasons.

The interest in these plants has grown and extended particularly in the last fifty years or so, and during the last thirty years, or thereabout, keen amateur and professional collectors have ransacked the mountain ranges of the world, to bring us new plants of great beauty and great interest mostly from the northern hemisphere.

Considerably less suitable plants have reached us from the southern half of the world, but the mountains of New Zealand, Tasmania and the Andes of South America have given us a fair number of attractive, suitable and tractable plants for our rock garden and quite recently, say during the last ten or twelve years, it has been found that even South Africa has furnished us with rock plants suitable to survive our very changeable climate. Let us here bear tribute to the much maligned climate of our islands: however much we may complain about its vagaries, it enables us to grow successfully in the open garden, or at most with the aid of a simple glass roof to throw off the bulk of our winter's wet, a greater variety of plants than any other country in the world.

As an example I would mention that we have found to our surprise that at least three plants collected on Mont aux Sources in Basutoland have withstood the last few winters here planted out in gritty soil in stone troughs standing fully exposed on our Sussex hillside at near 500 feet above sea-level, this despite almost record low temperatures which went below zero on three or four occasions. They did not even have a pane of glass tilted over them. That seems to point that a new field has been opened out to our collectors and we may look forward to further charming and interesting rock plants reaching us from the southern hemisphere. I am convinced that the Andes still hold out very great possibilities of new plant introductions and I am glad to know that a courageous lady is about to commence a two years' search of the great heights of Bolivia, primarily for the worthy purpose of discovering there hardy and disease resisting kinds of Potatoes and secondly to look for attractive alpine and Cacti, and who is to say that in the future we may not have to reserve a portion of our rock gardens for these prickly and quaint succulent plants which in the Americas invade alpine elevations and under a blanket of dry, powdery snow survive extremely low temperatures. Many of these have flowers of exceeding beauty to which a huge golden flowered *Opuntia* and a rich flame

coloured *Oreocereus* (please note the prefix, oreo = mountain *Cereus*, it is significant) bear witness as I pen these lines.

The Royal Horticultural Society is well alive to the possibilities that remain to add beauty to our gardens and I am not giving away secrets when I tell you that they are financially interested in one or two expeditions on which some of our collectors have started or are about to start—may they be successful! In thought I am going with these collectors and share, vicariously, in their joy at each new kind or especially fine form of mountain plant that rewards their efforts. What thrills will be ours who will eventually share in the raising of the seeds they send home or in the acclimatizing of such plants that they succeed in sending home in a living state!

At the present many of us are engaged on raising the big collection of seeds sent home from Eastern Tibet by MESSRS. LUDLOW AND SHERRIFF, expectations running the higher because a considerable number of these were received with merely a collector's number, without even giving the genus of the plant. So one watches the development of these unknown quantities from day to day and tries to make a guess as the true leaves appear among the cotyledons what this or that number may turn out to be. Many seedlings are up, too, from the seeds collected by my former pupil, MR. PETER H. DAVIS from his collecting in Anatolia last year; though so comparatively near home one or two new genera have turned up among his finds and quite a number of new species, among them an *Asyneuma*, nearly related to the *Phyteumas*, and one or two new *Campanula* species and a brand new *Crucifer* which even the collector has not yet seen in the flowering stage. So excitement runs high among the recipients of those newly brought home seeds and I hope that as many as possible of my listeners will endeavour to share in the fascination and the thrill of present and future collections of seeds of rock plants that will reach our gardens. It is not really necessary to go very far afield for new rock plants, there are many regions in eastern Europe for instance and even in the mountains of Spain that have not yet been fully explored for the possibilities they yet hold and one of this year's expeditions has just gone to Spain to follow on the hints brought home by our late friend DR. P. L. GIUSEPPI and his party, whose last year's visit to Spain, which because of the doctor's poor state of health was not fully carried out, gave ample indications of sundry very good plants that these little visited regions yet can contribute to our gardens.

The Balkans and the Caucasus too still hold much of value for our gardens, but finance regulations will prevent our collectors from re-starting the search in those regions which some of us had begun to undertake before the second World War.

After this lengthy preamble I will now invite you to view with me some of the results of recent and not so recent collecting trips to widely dispersed areas of the mountain world. We shall have to jump about nimbly from Balkan countries to the Caucasus, to Persia, to China, Tibet, Japan, the Himalayas and America for I have selected slides of plants from all these regions—some of them photographed *in situ* in their mountain homes and some grown in the confinement of pots or pans in our gardens. I have not arranged these to follow in any

geographical sequence or, indeed in any strict botanical order, though I am endeavouring to bring related plants into something approaching a sequence. The chief aim I have in mind is to display to you clear evidence that the great majority of such finds can be made at home in British gardens for, I know that specimens of all the plants we shall see upon the screen this afternoon exist in one or the other garden of our keenest plant lovers at the present day and there is little doubt that many of these in the years to come, as we find out better and better how to make these treasures at home in our gardens, will become spread far and wide in the gardens of those of us who find health, joy and undying interest in cultivating mountain plants.

May you all find relaxation in your gardens and in the cultivating of your plants from the uncertainties, difficulties and worries of these post-war days of doubtful peace!—there is nothing like burying your troubles and woes in your garden and your ultimate rewards will be great and satisfying.

And so to our slides and a few remarks about each one as it appears. *Diosphaera dubia*, now more often referred to as *Trachelium rumelicum* first met our eyes as our party was toiling up the lower slopes of the Thessalian Olympus in 1929. We were admiring the ingenuity of the local peasantry who had precariously built a tiny aqueduct against the sheer, white limestone cliffs to bring irrigation water to their small fields and vegetable gardens now far below us. It was built of loose slabs of limestone and lost a good deal of water in its rapid course and it was the spilling of the water that made us look up and just above the spillway we noted glorious little round tufts of sheer sky blue. A precarious way up was found and a few of the plants were pried out of the hard rockface and these eventually reached home and became the parents of the plants of this kind now fairly well known in our gardens. These never make flower stems more than 4 or 5 inches high and differ so much from the much bigger growing and far less tidy *Trachelium rumelicum* which we found in the Rhodope mountains of Bulgaria a few years later that quite arbitrarily I prefer to keep it under the name of *Diosphaera dubia*. The plant is most tractable and free flowering and a long-lived perennial as long as it is kept on short-comings, gritty limestone soil in this case, and it enjoys full exposure to the sun. Being related to the Campanulas it carries similar milky latex in its veins and is as attractive to the slug tribe as *Campanula Zeyssii* itself. So you have been warned. A year or two later DR. GIUSEPPI discovered *Diosphaera asperuloides* in the marble cliffs overhanging the upper courses of the river Styx in Greece. Here we have a tiny cushion plant of the greatest charm, it forms little hemispheres of anything from 3 to 4 to 9 inches across, according to your skill in cultivating it. About July–August it crowns every little rosette with a tiny soft blue trumpet flower until no foliage remains visible and thus it remains for two or three weeks, a perfect joy to every beholder and a source of attraction to the Humming-bird Hawkmoth which pays it periodical visits. It sets seeds freely and strikes as freely from tiny cuttings and endures for years with a potting on into larger receptacles from time to time, always in very gritty soil. Even after growing it successfully for

15 years or more we have not found the right position for it in the open rock garden and so keep it confined to pans in the alpine house.

Jankaea Heldreichii was the real object of our visit to Mt. Olympus which introduced us to *Diosphaeria dubia*. One read occasionally in books about this wondrous plant, but although I had been growing alpinists for over twenty years, by 1929 I had never seen a living plant of it, far less owned this almost mythical little plant. It belongs to the natural order of Gesneraceae, which in the far away past, when Europe enjoyed a much warmer climate, had many representatives in the northern parts of the world. A very few of these survived the tremendous changes and exist to-day as a "Remnant Flora" in isolated mountain ranges of this world. Western Europe in a few valleys of the Pyrenees retains *Ramondia Myconi*, or better known as *R. pyrenaica*. The Balkan peninsula retains *R. serbica* and the rarer *R. Nathaliae* and *Haberlea rhodopensis* and the *Jankaea* and after that we have to jump to China, Tibet and the Himalayas for other hardy representatives of this order. They are all beautiful and rare and isolated. Reginald Farrer wrote about this plant "To be grown in caves where neither sun or rain may tarnish its silvery vesture." Accordingly we looked under overhang rockfaces and shallow caves on great Olympus and found it not, but presently an easterly facing cliff was just plastered with the lovely rosettes clad in silver velvet and here and there the sparkling, lavender trumpets were just emerging. (Fig. 101.)

They were mostly out of possible reach, but continuing on our upward way through woodlands of Beech and thickets of prickly Evergreen Oak, Cistus, Christ Thorn, clambered over by *Clematis viticella* and horribly hooky Smilax, etc., we came among open stands of lovely *Pinus leucodermis* like great Lebanon Cedars and on mossy boulders facing up to the sky and warmed by the southern sunshine we came upon clustered masses of *Jankaea* too big to be accommodated in my hat. We came upon it again and again facing all points of the compass excepting due north. My unbounded faith in FARRER was sadly shaken until I considered that he, like the rest of us, probably knew the plant only from hearsay. So plentiful is the *Jankaea* upon Olympus, and only there, that children offered us eggs for sale in rough little baskets lined with the velvety rosettes of this wonderful plant. That *Jankaea* can be successfully grown in our gardens has since been amply demonstrated by several members of the Alpine Garden Society and many of you will remember a wonderful specimen in splendid health in full bloom brought to the R.H.S. Hall by MR. E. BALLARD of Colwell. To achieve merit, go and do likewise.

Our next slide represents *Didissandra lanuginosa**—all but a counterpart of the last plant from the mountains of China. This too has been grown and flowered successfully in our gardens but remains rare and uncommon. I believe LUDLOW AND SHERRIFF sent seeds once more last year of this treasure. *D. grandis*† is the next plant (Fig. 98); it too hails from the great mountains that form the roof of Asia and one hopes to see it more widely distributed in our gardens for the adornment of

* Now transferred to *Corallodiscus*.

† This has now been renamed *Corallodiscus Kingianus*.

our alpine houses. This species varies in flower from white to blueish or even bicolor and the stems bearing the flowers may grow up to almost a foot high. All of these are limestone plants and crevice dwellers by preference.

Asia gives us one more rare Gesneriad for the alpine house in *Conandron ramondioides*. This one hails from Japan where it descends quite low into the valleys and can be peeled off mossy rocks with the greatest ease. The Japanese call it Iwa Tobacco which means Rock Tobacco but they do not attempt to smoke the long and massive often glossy leaves of this plant. The reference to Tobacco is because of the big leaves and their general outline. The Conandron is not confined to the valleys but goes up high into the mountains and plants for our British gardens should be collected from the highest possible stations to achieve full hardiness (with glass covering) in our land. It likes a cool and moist position and will grow into noble specimens under cultivation; it is, perhaps just a trifle coarse in comparison with the other Gesneriads we have just discussed, but for all that it remains an acquisition not easily left out in a first-class collection of rock plants. The freely produced flowers, borne on branched stems somewhat resemble potato blooms in varying shades of purple or even pure white, and personally I think the form with glistening white, almost crystalline flowers the most desirable one. Lumps of very porous tuffa and lumpy peat in extra well drained pans make the most suitable growing medium for this plant. (Fig. 105.)

Our next slide takes us to Crete where PETER DAVIS discovered *Celsia acaulis*. It is a cousin of the *Verbascums* and makes a very neat rosette of basal leaves among which arise nicely rounded yellow, somewhat cupped flowers in great profusion. It is a good subject for pans in the alpine house but succeeds just as well on sunny rockwork in the open. It is a good perennial and comes readily from seed but it is inclined to interbreed with a cousin, *Verbascum phoenicium* and the result is a somewhat similar but bigger rosette of leaves from which springs a short but freely branching stem bearing a profusion of larger bronzy brown flowers. As far as I know this hybrid, which occurred simultaneously in several gardens has not yet received a distinctive name. It is a very charming plant and it has just been discovered that it can be successfully increased by root cuttings. We now come to one or two very distinct members of the *Campanula* family, the first one is *C. oreadam* which grows in limestone fissures on the very top of Mt. Olympus. The Oread's Bell-flower is a good perennial plant for narrow limestone fissures or for a pan in the alpine house. Its large violet purple flowers are a great joy. *Campanula Hawkinsiana* is a scree plant we found on Mt. Smolika of the Pindus range in Northern Greece in 1929, for the first time. (Fig 103.)

Those that the late MR. ATCHLEY and I sent home on that occasion were packed a little too damp and mouldered off on the long journey. DOCTORS GIUSEPPI and BEVAN went again in 1930 and brought home living plants from the same station. It has since been collected by E. K. BALLS but remains a fleeting, yet very beautiful inhabitant in our gardens. Only constant propagation from cuttings kept it going in our garden but in COL. STERN's famous garden at Goring-on-Sea it seeded itself

freely in a raised peatbed. He has been generous enough to renew our stock of it on more than one occasion. *Campanula saxatilis* is another very fine Grecian plant of which one or two specimen plants were to be brought up to our society for a possible Award of Merit to-day. Its flowers are rich sapphire blue, but the plants tend to be somewhat monocarpic and seeds must be saved after flowering to maintain a stock of it. The Dionysias were just as mythical in our gardens as was Jankaea. Keen and knowledgeable gardeners knew about them but no one had ever owned or seen a living plant of it until I persuaded the late DR. P. L. GIUSEPPI to visit Persia and hunt for these rare and exquisite plants of the hard, bare rocks of the waterless mountains of Iran. He was successful in that he found several of the species, each on its own isolated mountain top. Many of them were age-old cushions the size of half a football or even bigger and he hunted in vain for really young plants. He hunted for seeds too but was too early in the season, the plants were only just coming into bloom. He brought home medium sized cushions hoping these might revive despite the fractional root-stock which was all he could secure with them. I went over to visit him at his return and found him heartbroken at his failure to secure more promising material. To cheer him up I suggested that seeds of former years might lurk yet in old capsules buried in the dry and hard cushions he placed before me and getting his permission I borrowed rolling pins and cook's sieves in his kitchen and powdered the cushions to dust and sifted from sieve to sieve and fanned and blew the dust until at last round about a hundred good seeds were isolated from the chaff and dust and duly sown and these produced the first Dionysias even seen in cultivation. Some of these survive to the present day and some few more were collected a few years later by E. K. BALLS who retraced the doctor's footsteps until finally four or five of the species have been shown before the R.H.S. Here are five slides depicting four of the species partly taken *in situ* in the mountains and partly of cultivated plants. Botanically these Dionysias stand between *Primulas* proper and the aretian *Androsaces*. They require rare cultural skill, they are very easily overwatered and it will be a long time before they become at all frequent inhabitants in our gardens. (Slides of *D. Michauxii*, *bryoides*, *curviflora* and *oreodoxa* were next thrown on the screen.) (Fig 104.)

We next come to some of the rarer *Violas*. The first one of them *V. albanica*, was found on the same occasion that *Campanula Hawkinsiana* was found. Somewhat lower down on Mt. Smolika whilst traversing a very steep serpentine scree slide we were charmed by a delightful little apparently deep rose coloured *Viola*. Very little of the plant was visible, just a tiny tuft of leaves, stained brownish-red like the scree itself and above it on inch high stems these surprising, nicely rounded flowers which on closer observation were found to be soft pink with a mahogany red reverse which made them appear many shades deeper in colour. Alas! it did not survive long in cultivation and sadly needs collecting again until we fathom all its wants and needs and make it a permanent charmer in our gardens. *Viola Doerfleri* occurs in both Greece and in Albania and was a delightful little blue round-faced *Viola* of little permanence and I hope it may be re-introduced. *V. Grisebachii*

takes me back to happy hunting days in Bulgaria in 1934. We were camping in a very secluded little hollow in the Pirin mountains and were on our way to climb the peak of El Tepe when among embedded limestone boulders in a terrific rockslide we came suddenly upon its bland lavender blue faces peeping out at us from under perilously perched blocks. It was irresistible and collected and sent home and lived with us for a time until the neglect of the long war years put an end to its glory. (Fig. 102.)

V. delphinantha takes us back both to Mt. Olympus and later to Mt. Ali Botusch in southernmost Bulgaria, in fact Ali Botusch is half in Greece. In both these places this extraordinary *Viola* is to be found plentifully in a painfully circumscribed area where it grows as a limestone crevice plant hard, if not impossible, to pry out of its fissures too narrow for even a knifeblade to enter. Fortunately it seeds fairly freely and careful search reveals little round capsules like mustard grains lurking between the narrow, evergreen leafage. The whole plant rarely exceeds 2 or 3 inches and the little fine bushes it forms look like tiny Yew trees seen through the wrong end of a telescope. The soft pink flowers have an unbelievably long, slender, curved spur more like a Larkspur than a *Viola* bloom.

Both, collected bits of plants and seeds, arrived home and lived with us and elsewhere in fair content until the war. A year or two later we were hunting in Albania for another *Viola* of this unusual section and had been given a description of its station by the late PROF. KOSANIN in whose honour this *Viola* is named *V. Kosaninii*. Quite near the Yugo-Slav border in N. Albania Mt. Jalica Ilumnes rears his proud head up to some 8,000–9,000 feet. Half way up a terrific, deep gash traverses one side of it, cleaving deep into the bowels of the earth, I think this is a geological fault, not a water carved gorge, it is dark and awe inspiring and it is so narrow in parts that tumbled boulders remain wedged between the walls under which one has to crawl to gain the upper end where this *Viola* lives. It is in every way similar to *V. delphinantha* but the spur is shorter and its colour is rosy-lilac. Alas! this too is lost again as is also, for the present the third member of this very curious group of *Violas*, *V. cazorlensis* which finds in the Sierra Cazorla its only home. Jalica Ilumes, whilst we are on it, gave us another very choice find in *Saxifraga karazidgensis*. This is a *Kabschia Saxifraga* of the section *marginata*, the smallest and most condensed member of that group but with surprisingly big, glistening white flowers on quite short stems over a firm huddle of dark green, silver braided rosettes individually no bigger than those of *S. caesia*. The plant has happily survived the war years with us, albeit in very restricted numbers until it can be propagated by minute cuttings.

Daphne oleoides is our next slide, it takes us back to Bulgaria where it is the chief undergrowth under *Pinus leucodermis* and *P. Peuke* forest in open stands high up in the Pirin mountains. It makes charming little bushes, like grey-leaved little Box trees smothered with heads of sweet-scented white flowers. It is most curious that all our encyclopaedias and reference books say it has purple flowers and make it much too tall growing. It can scarcely be known in our gardens in its

true form. It has survived the war years here as a single specimen or two and certainly must be propagated again.

Another great find was *D. glomerata* which we first stumbled upon in the Adyl Su valley of the north-western end of the Caucasus in 1935. I shall never forget the triumphant shouts of DR. N. W. JENKINS with which he summoned us up to his side to help him admire a yard long drift of the neat 6-inch high branches, most of them ending in a fragrant head of white stars perched on crimson tubes: it was indeed a sight for the Gods. Here are two slides of it, one from the valley and another from thousands of feet higher on Mt. Dongus Orun which at first we thought was yet another species of Daphne (*D. glacialis*). Mt. Dongus Orun gave us also our first taste of *Anemone narcissiflora* var. *umbellata*. We were about to make our camp on a grassy shoulder of that stupendous mountain. Thick mist enveloped us but we got the tents up and our pony boys had a fire going and a kettle boiling for our evening meal. Suddenly the mist cleared in a rising breeze, the sun peeped through once more and around us thousands of Anemones in loosely clustered heads opened their eyes to the great Sun God which rules their lives. There they were, white, blush pink, rosy, soft lemon yellow to almost orange yellow and above glistened snow caps and wicked looking greeny blue hanging glaciers, a breath-taking scene of the most marvellous beauty and grandeur.

A few days later on a similar shoulder of Mt. Kasbek we came upon a much bigger and more lush growing form of this Anemone, shell pink with an almost mahogany red reverse which lent additional colour to the fine flowers. That particular form is still with us thanks to the skill of DR. JENKINS whose exquisite packing ensured a few live plants reaching home. As I write it is sending up a second crop of blooms this year.

Mt. Elbruz brought us a new Salix, a dwarf Willow, in *S. apoda*. The first find of it was the female form, a short little bush with uprising branches up to 12 or more inches, each little branch set with 4 inch long soft green catkins like so many little Christmas-tree candles.

It was not until we tried to dig up some young bits of it that we too found the male form of the same plant. In this all the branches were quite prostrate and set with rows of little grey mice waving their pink noses in the air and some of the little mice had collars or neckbands of yellow where a ring of open stamens surrounded the little grey body. This was a revelation, never had we noticed such a great difference between the two sexes of the same Willow—both of them nice, but the male one altogether charming. I was inclined to leave the Caucasus on this note but one more wonderful find must be mentioned and shown to you. Here it is, *Linnaea borealis*. We all know the plant is a rare native of ours, long may it remain so and that it is frequently found in the mountains of Europe and also of America, but somehow we had not looked for it in the Caucasus until we noticed its wonderful scent on a breeze from a wood of *Pinus hamata*, the Russian version of our Scots Fir. Penetrating into the gloom of the wood we found great stands of *Lilium Szovitsianum* and among them upon a fallen Pine stem mouldering away on the mossy forest floor a shroud of *Linnaea borealis* many yards long and reaching the ground on both sides, a wonderful pall for a

fallen monarch of the forest. There must have been literally millions of the dainty, sweet scented pink and white twin flowers, tiny bells upon thread fine stems. And here we return once more to the mountains of far away High Asia to look at a few of the Cassiope, to all appearance Clubmosses set with Lily of the Valley bells. The first one is the Himalayan *Cassiope fastigiata*, with straight upright stems from which at the tip, or near it, spring a few lovely white bells of generous outline on thin, pink footstalks. A lovely plant for a cool spot, out of the wind and in peaty or at least lime-free loam. From very high up along the border between Burma and Tibet one of our great present-day explorers sent us *C. Wardii* which will keep his name and memory green. It is as yet to be seen in very few gardens and these in the north. It is indeed a worshipful plant.*

Charming too, more lowly and a fine carpeting plant in a cool shaded nook in woodland or among dwarf Rhododendrons, is *C. lycopodioides*. A carpet of interlaced branches for all the world like Clubmoss of modest growth and above it on fine, threadlike stems, thousands of fairy-bells of purest white. Japan gave us this little treasure and it also gave us *Arcteria nana*, another very charming dwarf and creeping Ericaceous shrublet with rounded little evergreen leaves and clustered white bells exhaling a gentle fragrance. The *Cremanthodiums*, a curious race of composite flowers seem confined to the Himalayas, here is one of the most recent discoveries of the genus *Cremanthodium Sherriffae*.†

The ray florets do not expand and the flowers do not lift up and look at the sky, the plant simulates the appearance and the habit of the Soldanellas of the Alps of Europe. Few of the *Cremanthodiums* have as yet become inhabitants of our gardens, they have looked in in passing and passed on, missing the Yak and the Lamas and the thin air of High Asia, no doubt. A lovely Ericaceous shrublet and a recent discovery from the high mountain woods of Oregon is *Kalmiopsis Leacheana*. That too seemed to suffer from incurable homesickness for a time. We raised hundreds from imported seeds and the youngsters grew ahead without much initial difficulty, and it was when they reached about four years that they seemed to find fault with our treatment and with the gardens of a good many other people who had acquired them.

There was a wholesale departure of them for the happy hunting grounds from whence they had come to us. Fearing a total loss of the remaining ones of the clan in our garden, my son tried a desperate measure, he took half a dozen of the little invalids and planted them into his choicest limestone scree, saying "Live or die, take your choice you intractable little beggars!" or words to that effect.

Believe it or not, they took heart of grace from that moment and made fresh growth and flowered and keep on increasing, even attempting to flower twice a year during our longer mild season compared with the short summer high up in the mountains of Oregon.

* Wisley has nice crop of seedlings of this Cassiope.

† *Editor's Note.* This *Cremanthodium* was figured in the JOURNAL, vol. 72. 1947, p. 78, under the name *Cremanthodium palmatum* subsp. *rhodocephalum* and its nomenclature is discussed by DR. GEORGE TAYLOR on p. 170 of the same volume.

Our last slide is of one more little American. A cushion plant and yet a tiny shrub. In 1936 my son and a friend spent some months in the Rocky Mountains and foregathered with many pleasant and hospitable Americans and Canadians and exchanged much plant lore with them. They were told of a terrible deep river gorge with sheer sides in Montana and made their way there to see a recently discovered vegetable wonder. Here is a home-reared seedling plant of that expedition. The plant is rosaceous and closely allied to *Spiraea* and its name is *Kelseya uniflora*. In the gorge mentioned, or rather on its steep sides, are clumps of this *Kelseya* nearly 6 foot long, 2 or 3 feet across and humped irregularly. All this from one taproot that burrows deep into the heart of the cliff on which it grows. A transverse section of one of these taproots, according to American friends, reveals an age of over 1000 years. And on this remarkable age record for a cushion forming rock shrub I will close my talk to you, hoping that I have stimulated you to further efforts to grow and enjoy the wealth of rock plants at our disposal and the many additions we may yet confidently look forward to.

NEW AND NOTEWORTHY PLANTS

Camellia (*reticulata* × *saluenensis*) 'Inamorata'*

ON March 24, 1936, LT.-COL. STEPHENSON CLARKE received the Award of Merit for his hybrid *Camellia* × 'Salutation,' the result of crossing *C. saluenensis* with the garden form of *C. reticulata*. This plant was illustrated last June in vol. 73. fig. 69 of the Royal Horticultural Society's JOURNAL. The photograph shows large semi-double flowers which were described at the time it was exhibited as being rose-pink in colour.

In the present part of the JOURNAL there is a copy of a painting by the Society's artist MR. A. J. WISE of the new hybrid *Camellia* (*reticulata* × *saluenensis*) 'Inamorata' resulting from hybridizing *C. saluenensis* with the wild form of *C. reticulata*. The pleasing-looking flowers are single, quite 3 to 4 inches in diameter and a rich rose-pink in colour with a circle of golden tipped stamens protruding from the centre. (Fig. 121.)

C. reticulata (garden form) was first introduced into this country from China in 1820. This is probably the most magnificent of all Camellias with the 5-inch semi-double deep rose flowers which can hardly be surpassed for beauty by any other flowering shrub. After approximately one hundred years the late MR. GEORGE FORREST found the wild form of the species *C. reticulata* growing amongst scrub on the hills around Tengyueh (Yunnan). He collected seed and sent it home under the following numbers, 7662, 9305, 9715, 25352 and 27165.

This, the wild form, is figured in the *Botanical Magazine*, vol. CLVIII,

* In accordance with the procedure for naming garden hybrids set out in R.H.S. JOURNAL 1945, p. 179, the name "Inamorata" is proposed as the *third* term of the name, the second term being the formula *reticulata* × *saluenensis*. For the present it does not seem necessary to propose a name to replace this formula. Any subsequent plants resulting from the same cross, if they differ sufficiently from "Inamorata," will, of course have to be given a different "third term" name.

t. 9397, from material supplied by the late MR. J. C. WILLIAMS of Caerhays Castle, Cornwall, which was grown from seed of Forrest 25352.

The wild *C. reticulata* has single flowers much smaller than the larger, semi-double blooms of the garden form. The latter makes a rather loose spreading bush, whereas the wild species grows much more erect, flowers earlier in the season and has the appearance of making quite a small tree.

C. saluenensis was also introduced to this country by FORREST during this century and together with *C. reticulata* is of doubtful hardiness. However, here at Wisley (which is not a favoured garden by any means) one plant of each, 4 to 5 feet high, have bravely stood the past three winters planted against the wall of the Curator's house, and at the moment of writing appear to be growing quite freely. Planted in the same place in similar conditions *C. reticulata* (garden form) was killed during the winter of 1946-47. These three plants had previously been growing in my private garden at Exbury and were lifted and brought with me to Wisley during the winter of 1945-46. At Exbury, planted on a sheltered north wall, they all flowered regularly and several flowers of *C. saluenensis* were crossed with pollen from *C. reticulata* (wild form) resulting in a harvest of only one fertile capsule containing two seeds.

These were simply pushed into the ground under the wall by the side of the parent plants as soon as they were ripe enough to pick, and one germinated the following spring. Eventually it came to Wisley to be planted in the Temperate House and this one seedling Camellia is now the subject of this short article. Growing under such ideal conditions it has grown very rapidly and during the months of last February and March it bloomed very freely, proving itself well worthy of an extended trial.

Efforts are being made to root it from cuttings, hoping to get sufficient stock to enable it to be planted amongst the large collection of Camellias already being established on Battleston Hill where it is hoped it will prove quite hardy and in years to come give much pleasure to Fellows visiting the gardens during early spring.

FRANCIS HANGER,
Curator, R.H.S. Gardens, Wisley.

THE HOUSE OF VEITCH

Charles H. Curtis, F.L.S., V.M.H.

PART II

A HIGH standard of cultivation was demanded from all who were employed in the Veitchian nurseries. No plant of any kind was dispatched to a customer unless it was a good one and perfectly clean. The firm built up a great reputation for excellence in production and maintained it until the last. You had to be a good grower to remain at Chelsea or Coombe Wood. I remember young men who came to

Chelsea on the strength of father's reputation and recommendation, but were sent home at the end of the first fortnight.

THE MESSRS. VEITCH were more than first-class nurserymen and seedsmen, hybridists and raisers and the publishers of classic horticultural books; they were adventurers. Some very "tall stories" have been told about the adventures of plant collectors in foreign lands. We know that certain stories had a basis of truth upon which imaginative journalists built up an exciting narrative, with plenty of hair-breadth escapes. It must, however, be remembered that the earlier plant collectors risked life and limb in their efforts to obtain new or rare plants for the firms they served. Moreover, difficulties of transit and transport were far greater in Veitchian times than now. The House of Veitch held, and holds, a wonderful record of collectors and plant discoveries. It was ready to take great risks; instead of a policy of "wait and see," it adopted one of "go and find". Like the Elizabethan sea dogs and the Bristol Venturers, it was adventurous, but, like the old sea captains, it chose loyal, knowledgeable, courageous and physically fit men for its ventures. Whom did they choose and what did the intrepid collectors achieve?

WILLIAM LOBB, a Cornishman, entered the service of JAMES VEITCH at Exeter in 1837 and, later, became gardener to MR. STEPHEN DAVEY at Redruth, where he studied botany and gave such evidence of resourcefulness, keen powers of observation, and a desire to travel, that he was engaged by MR. VEITCH to explore parts of South America. He left Plymouth in 1840, arrived at Brazil, crossed the Argentine and the Andes and entered Chile. He discovered numerous Orchids, and on his return in 1844 brought home seeds of *Araucaria imbricata*. Satisfied with the results of this first expedition, MR. VEITCH sent him off again; this time he travelled in Southern Brazil, Southern Chile, Valdivia and Northern Patagonia, but subsequently went north and extended his explorations to California. WILLIAM LOBB found California to his liking, and after a visit to his homeland returned thither in 1854, where he remained for several years after the conclusion of his Veitchian commission in 1857. He died in California in 1863. The plants found or introduced by WILLIAM LOBB include *Berberis Darwinii*, *Lapageria rosea*, *Araucaria imbricata*, *Abies bracteata*, *Sequoia gigantea*, *Pseudotsuga Douglasii*, *Pinus ponderosa* and *Embothrium coccineum*.

THOMAS LOBB, brother to WILLIAM, served in the Exeter nursery in early life, and in 1843 was engaged as a collector to explore parts of China and Java. As China did not receive him gladly, he proceeded to Java and the adjacent islands. Under a second commission THOMAS LOBB explored north-east India, visiting the Khasia Hills and Assam; later he travelled in Moulmein, Lower Burma, the Malay Peninsula and Northern Borneo. He explored these far-eastern countries during a period of twenty years and his discoveries and introductions include *Aerides Fieldingii*, *Cypripedium villosum*, *Vanda coerulea*, *Pleione lagenaria*, *Rhododendron javanicum*, *R. jasminiflorum* and *Nepenthes sanguinea*.

PLANCHON created the genus *Lobbia* in the Natural Order Aristolochiaceae to commemorate the LOBB brothers, one of whom, THOMAS,

discovered the type species, *dependens*, near Singapore. THOMAS LOBB suffered considerably as a result of his long and hazardous journeys in the East and had the misfortune to lose a leg. He returned to Devoran, Cornwall, where he died "at a very advanced age."

ROBERT PEARCE entered service at Exeter in 1858 and in the following year agreed to collect plants "and other objects of Natural History" in South America for three years. His instructions were to collect trees valuable for timber, hardy flowers, trees and shrubs, Orchids and other stove and greenhouse plants. PEARCE introduced *Eucryphia pinnatifolia* and, during his second expedition in 1865, collected *Nierembergia rivularis*, *Hippeastrum pardinum*, *H. Leopoldii*, *Begonia Pearcei*, *B. boliviensis* and *B. Veitchii*, thus laying the foundations on which were raised the magnificent Hippeastrums of to-day and the popular race of tuberous-rooted Begonias. In 1866 PEARCE concluded his service with the VEITCHES and became a collector for MR. WILLIAM BULL, whose nursery in King's Road, Chelsea, was only a few yards from the Veitchian establishment. He was taken ill soon after his arrival at Panama, where he died in 1867.

JOHN GOULD VEITCH was fortunate in that, on his trip to Japan in 1860, he was attached to the suite of the British Envoy to Japan, SIR R. ALCOCK, and thus enjoyed favoured treatment in a country where ports had but recently been opened to foreigners. He was remarkably successful and succeeded in introducing *Larix leptolepis*, *Primula japonica*, the popular *Ampelopsis Veitchii* (*Vitis inconstans*), *Sciadopitys verticillata*, *Pandanus Veitchii*, *Aralia Veitchii*, *Abies Veitchii*, *Lilium auratum* and numerous Codiaeums and Dracaenas. Alas! JOHN GOULD VEITCH was taken ill in 1867 and remained an invalid until his death in 1870 at the early age of thirty-two. He was the first of the collectors sent out from Chelsea, as PEARCE was engaged at Exeter although he subsequently travelled for the Chelsea firm.

Very little is known of DAVID BOWMAN, a Scot, who came south and served in the Royal Horticultural Society's Gardens at Chiswick. He was engaged to explore in Brazil, where he found several stove plants that were once fairly popular. He left England in 1866 and died at Bogota in 1868. HENRY HUTTON, who travelled in the Far East, resided in Java for a year, collected a few Orchids and died in 1868. Nor was CARL KRAMER a successful collector; after failing in Japan, he went to Central America, but the only plant of note associated with his name is *Odontoglossum Krameri*, which he introduced from Costa Rica. GOTTLIEB ZAHN had a very brief experience as a collector; he, too, visited Central America in 1869 and introduced several interesting Bromeliads, but failed in the main object of his expedition, to find and introduce *Miltonia Endresii*, an Orchid WARSCEWICZ discovered in 1871 (as *Odontoglossum Warscewiczii*). A. R. ENDRES, sent out in 1871, was not very fortunate, and although he sent home *Cattleya Dowiana* and *Epidendrum Endresii*, his mission proved expensive and unsatisfactory, notwithstanding his previous experience as a collector for MR. JAMES BATEMAN.

J. H. CHESTERTON, a roving and reckless person, arrived from South America with numerous Orchids, beautifully packed and in fine condition; he offered his collection to MESSRS. JAMES VEITCH AND SONS, who

purchased it and engaged CHESTERTON to return to South America and collect *Miltonia vexillaria*, previously referred to as "the Scarlet Odontoglossum" by BOWMAN. He was successful and plants reached Chelsea where the long-sought *M. vexillaria* flowered for the first time under cultivation in 1872. CHESTERTON collected fine forms of *Odontoglossum crispum* and the gorgeous *Masdevallia Harryana*. Later, he left the House of Veitch and worked independently until his death at Puerto Berrio in 1883. His epitaph in the Shipping List of that year reads "Poor Chesterton's reckless spirit rendered him very efficient as a plant collector."

GUSTAVE WALLIS, a most remarkable man, was born near Hanover in 1830. He was deaf and dumb until six years old, and, for the rest of his life suffered from defective enunciation. But WALLIS had an indomitable spirit and abundant energy and, in spite of his afflictions, he became proficient in several languages. Apprenticed to a gardener at Detmold when sixteen, young WALLIS subsequently obtained employment at Munich, and while there paid several visits to the Alps, where he collected and studied alpine plants. In 1856 he was engaged by a famous firm to collect plants in Southern Brazil, but the firm went bankrupt and WALLIS was stranded. In 1858 JEAN LINDEN of Brussels sent him to South America. He crossed the continent from the mouth of the Amazon to its source—a remarkable and hazardous journey. In 1870 the MESSRS. VEITCH commissioned him to explore the Philippines, but once again the mission was very expensive and practically a failure. However, in 1873, he was sent to Colombia where, in addition to many Orchids, he collected the handsome *Anthurium Veitchii* and the now rare *A. Warocqueana*. At the conclusion of his contract with the Chelsea firm he continued to explore and collect plants in South America. He died at Cuenca in 1878. He is best remembered by *Epidendrum Wallisii*.

After serving in several notable private gardens, WALTER DAVIS, a Hampshire man, went to Chelsea in 1870. He worked under JOHN DOMINY, then in charge of the New Plant Department. Three years later he was sent to South America with special instructions to collect *Masdevallia Veitchiana* in quantity. His quest proved successful. Like WALLIS, he crossed the continent of South America by way of the Amazon valley. He discovered *Masdevallia Davisii* and on his return in 1877 he took up botanical work at Rothamsted, but finished his career at the Chelsea nursery.

Although he belonged to the Exeter firm and eventually became head of it, PETER C. M. VEITCH came to London in 1867 and served as an Assistant at Coombe Wood, where he made a special study of trees and shrubs. Later, after a period in the New Plant Department at Chelsea, he spent some time in Dutch and German nurseries. A sea voyage was prescribed and in 1875 he proceeded to Australia by the long sea route. He visited Fiji, but his collections were lost during a great storm. Excursions were made to several parts of Australia. He sent home *Lomaria discolor* and *L. bipinnatifida*. In 1877 MR. PETER paid a special visit to New Zealand and was successful in collecting seeds of *Ranunculus Lyallii* and in introducing *Notospartium Carmichaeliae* and several *Celmisias* and *Veronicas*. In the same year he returned to Australia and

while making his way to New Guinea he was shipwrecked and his collections were lost. At that time F. W. BURBIDGE, subsequently Curator of the Trinity College Gardens, Dublin, was collecting in Borneo for the Chelsea firm, and P.C.M. joined him in 1877 and, together, they collected *Nepenthes* and Orchids. They reached home safely, with their collections intact in 1878, and MR. PETER returned to Exeter.

BURBIDGE became a prolific writer, and his story of his Bornean trip is told in *The Gardens of the Sun*, published in 1880.

GUILLERMO KALBREYER, one of the most successful of Veitchian collectors, was sent to West Africa in 1876, and a year later returned with *Gardenia Kalbreyeri*, *Pachystoma Thomsoniana* and several species of *Mussaenda*. Tropical heat did not suit KALBREYER, so he was sent to Colombia where he collected *Odontoglossum Pescatorei* (now *O. nobile*). After exploring in the Eastern Cordilleras he started for home, but owing to the delays on the Magdalena River half his collection was useless when he reached England. On the occasion of his third trip, he again proceeded to the Eastern Cordillera, where he found *Odontoglossum Pescatorei* var. *Veitchii*, besides *O. triumphans*, *O. hastilabium* and *O. coronarium* and was able to send home several consignments of Orchids before his return with another fine collection. Once again, in 1879, he went out to Colombia and collected no fewer than a hundred species of Palms, *Cattleya aurea*, *C. gigas* and various *Masdevallias* and *Odontoglossums*. He was particularly successful in collecting Ferns and sent home dried specimens of 360 species. His last trip on behalf of JAMES VEITCH AND SONS commenced in 1880 and resulted in fine collections of Orchids, including *Odontoglossum crispum* in quantity. Subsequently KALBREYER settled in Bogota and established himself as an exporter of Orchids.

CHRISTOPHER MUDD was sent to South Africa in 1877 but proved a failure as a plant collector.

CHARLES MARIES studied botany under PROF. HENSLOW in the Grammar School at Hampton Lucy, Warwickshire, and served in a small nursery at Lytham in Lancashire before obtaining employment at Chelsea, where his industry and keenness led to his selection to explore in Japan and China. MARIES had a fine presence, but his masterful manner so successful in Japan got him into trouble in China. He spent several years in Japan and succeeded in introducing *Abies Veitchii*, *Hamamelis mollis*, *Styrax Obassia*, *Lilium auratum* var. *platyphyllum*, the white form of *Spiraea palmata*, *Platycodon Mariesii*, *Davallia Mariesii*, several Bamboos and varieties of *Iris Kaempferi*. BRETSCHNEIDER recorded thirty-eight new plants first discovered by MARIES. On the completion of his service with the Chelsea firm, CHARLES MARIES was appointed Superintendent of the MAHARAJAH OF DURBHUNGAH'S gardens in India. A few years later he laid out the gardens of the MAHARAJAH SCINDIA OF GWALIOR which, with the Gwalior State Gardens, he superintended until his decease in 1902. MARIES was one of the original recipients of the Victoria Medal of Honour.

CHARLES CURTIS came from Barnstaple and served for four years in the New Plant Department at Chelsea before being chosen to explore

Madagascar and the Mauritius in 1878. He found *Nepenthes madagascariensis* and was able to send home a large consignment of *Angraecum sesquipedale*; the first lot he collected was lost owing to the treachery of a native servant who ran away with part of his kit after cutting the rope which held the raft on which the plants were being floated down a river to a port, so the work had to be done all over again. CURTIS returned in 1879, and in the following year proceeded to explore Borneo, Sumatra, Java and the Moluccas. DAVID BURKE went with him and subsequently returned with plants collected chiefly in Sarawak. This collection included the beautiful *Leea amabilis*, large numbers of *Cypripedium Stonei*, *C. Lowii* and numerous Vandas and Rhododendrons. Later, CURTIS discovered *Nepenthes Northiana*, previously known only by a drawing made by MISS M. NORTH, now in the North Gallery at Kew. MR. HARRY VEITCH saw the drawing and though MISS NORTH could offer little assistance geographically, she remembered that the material for her painting was brought to her while she was in Sarawak. Sarawak is no small place, but after several disappointments he was able to gather and send home seeds of this noble Pitcher Plant. (Fig. 99.)

After BURKE had returned to England, CURTIS explored Dutch Borneo with a special mission to collect *Phalaenopsis intermedia*. He was successful, but once again lost his first lot of plants, his clothes and instruments, and nearly lost his life as the result of a boat accident. He discovered and sent home *Cypripedium Curtisii* (Fig. 100), *Nepenthes Curtisii*, the brilliant *Rhododendron multicolor* var. *Curtisii* and *Medinella Curtisii*. At the conclusion of his engagements with the Chelsea firm he was appointed Superintendent of the Botanic Gardens at Penang, a post he held until the end of 1903, when failing health compelled his retirement. He returned to his beloved Barnstaple where he grew Peaches, Carnations, the double Marguerite and Sweet Peas in a garden above the Great Western Station. He died, following a severe operation, in August 1928.

DAVID BURKE's first solo expedition was to British Guiana, where he rediscovered the quaint *Heliamphora nutans* and found *Zygopetalum Burkei*; he also sent home the very beautiful *Amasonia punicea (calycina)*, which I had the pleasure of cultivating. BURKE made two journeys to the Philippines in search of *Phalaenopsis*, two to New Guinea and one to Upper Burma. Between 1894 and 1895 he made three trips to Colombia in search of *Cattleyas* and *Odontoglossums*. In 1896 he again proceeded to the Celebes and the Moluccas to collect Orchids. He died in Amboina in April 1897, far from any European. JAMES H. VEITCH, after serving in the Chelsea and Coombe Wood Nurseries, commenced a "grand tour" in 1891 and finished it in 1893. He travelled in India, the Malay, Java, Japan, Korea, the Australian colonies and New Zealand. It was a great experience and everywhere he was assured of a welcome, for the name of Veitch was then very widely known and respected. He was not particularly successful as a plant collector, indeed the trip was not an "expedition" but undertaken as a preparation for the business of management at Chelsea. I knew him quite well and deeply regretted the breakdown which followed his assumption of full responsibility. However, we are indebted to him for the introduction of the autumnally-

gorgeous *Vitis Coignetiae*, of *Physalis Francheti*, *Rhododendron Schlittenbachii* and the beautiful flowering Cherry that was known for many years as 'James H. Veitch'.

The last of the Veitchian collectors was E. H. WILSON, who served under LATHOM in the Birmingham Botanic Gardens, Edgbaston, before entering Kew. SIR WILLIAM THISELTON-DYER, then Director of the Royal Botanic Gardens, Kew, recommended him as a suitable person to undertake an expedition to Central China in search of woody and other plants likely to prove hardy in the British Isles. WILSON studied herbarium specimens and travelled across North America after a short stay at the Arnold Arboretum; he arrived at Hong Kong on June 3, 1899, to begin his journey to Szemao, where he hoped to meet DR. AUGUSTINE HENRY, who was in the Chinese Customs service and had a very intimate knowledge of the flora of Yunnan and other districts where duty or pleasure took him. After a delay of several weeks due to a native rising in Mengtsze, WILSON joined HENRY, from whom he received every consideration regarding travel and probable rich locations. The story of WILSON'S travels are to be found in his own books and, partly, in *Hortus Veitchii*. He explored the Yangtze valley, the mountain ranges below Ichang, in Szechuan and the Tibetan border, and his various journeys covered a period of five years. He was clever and enthusiastic and surmounted all the difficulties that arose. He was also blessed with a good physique and a kindly manner and was a most successful plant collector. His herbarium specimens amounted to 25,000, representing about 5,000 species, while his introductions include *Jasminum primulinum*, *Actinidia chinensis*, *Buddleia variabilis* var. *Veitchiana*, *Senecio clivorum*, *Clematis montana* var. *rubens*, *Davidia involucrata*, *Meconopsis integrifolia*, *M. puniceus*, *Primula vittata*, *Libocedrus macrolepis*, *Acer griseum*, *Deutzia discolor*, *D. Wilsonii*, *Spiraea Veitchii*, *Vitis Henryana*, *Magnolia Delavayi*, *Artemisia lactiflora*, *Astilbe Davidii*, *Corydalis thalictrifolia*, *C. Wilsonii*, *Paeonia obovata*, *Primula pulverulenta*, *P. Veitchii*, *P. Wilsoni*, *Senecio Wilsonianus*, and of course, *Lilium regale*, but this last was discovered later, when WILSON was collecting for the Arnold Arboretum and after he had terminated his agreement with the House of Veitch.

The *Hortus Veitchii* records that the House of Veitch introduced 232 Orchids, about 500 Stove and Greenhouse Plants, 118 Exotic Ferns, about 50 Conifers, 153 Deciduous Trees and Shrubs, 72 Evergreen and Climbing Shrubs, 122 Herbaceous and 37 Bulbous plants—truly an amazing record.

In addition to collectors sent out at the expense and on behalf of the firm, the MESSRS. VEITCH had correspondents in almost all parts of the world, who were interested in plants and sent home specimens, seeds or bulbs. It was my privilege to know PETER C. M. VEITCH, F. W. BURBIDGE, CHARLES MARIES, DAVID BURKE, JAMES H. VEITCH, CHARLES CURTIS, WALTER DAVIS and E. H. WILSON—those were the days, spacious and gracious times, full of interest and excitement and when I listened to their stories I often wished I had "gone a hunting" myself instead of writing about their discoveries.

SOME ASPECTS OF PLANT PROPAGATION BY CUTTINGS

WITH SPECIAL REFERENCE TO THE SELECTION
OF MATERIAL*

E. E. Kemp

(ROYAL BOTANIC GARDEN, EDINBURGH)

IT is probably well known that almost the entire work in the Plant-Propagating Department of the Royal Botanic Garden, Edinburgh, is carried out by student-gardeners from all over the British Isles. These students, therefore, are fairly representative of the average young horticulturist in this country, and in supervising their work, the same mistakes are found to occur again and again. Since it is probable that these mistakes also occur in the horticultural establishments in which they have been trained, it was decided, therefore, to deal with some of them. It must be made clear that in using the word "mistake," it is not necessarily any deviation from accepted horticultural practice which is meant, but any faulty technique which reduces the number of healthy plants obtained from a batch of cuttings. Finally, it is believed that the vital processes which take place within the cutting during the period between the isolation of the shoot from the parent plant and the production of roots are not very widely known. It is intended, therefore, to discuss some of these, since the more that is known regarding the physiology of the isolated shoot, the more intelligently may the external factors which influence the rooting of the cutting be controlled.

At the outset, it should be clearly understood that the following remarks refer mostly to the moderately difficult species—those which although somewhat difficult to root may, nevertheless, still be increased economically from cuttings on a commercial scale. It is with these moderately difficult species that needless losses most frequently occur.

All these points which have been selected for discussion may be conveniently dealt with under the following sub-titles: 1. The Selection of Material; 2. The Preparation of Cuttings for Insertion; 3. Remarks upon Rooting Media and the Handling of Rooted Cuttings.

SELECTION OF MATERIAL

This is really the most important point in propagation by cuttings. Appropriate material will sometimes root under unsatisfactory conditions, but badly chosen material will rarely root under the best of conditions. Certainly many have experienced on opening a consignment of cuttings the disappointment of finding the material unsatisfactory or even completely useless. One can usually tell at once by the material if the consignor is familiar with the technique of propagating plants.

The selection of suitable material is easier to demonstrate than to describe, and accordingly photographs have been introduced to illustrate this point (Fig. 107), but the following rules will serve as a general guide in choosing material. As regards softwood cuttings, laterals

* Based upon a lecture delivered to the Surrey Horticultural Progress Club on December 19, 1947.

should be chosen in preference to leaders, and thin, starved shoots in preference to thick, vigorous shoots. The type of shoot which those familiar with the management of Apple trees understand by high nitrogen growth should be avoided. In fact, it has been shown experimentally that a high carbohydrate/nitrogen ratio favours rooting, and possibly for this reason it is generally true that cuttings from established plants root more readily than those from newly planted, vigorous plants. But vigour is closely related to age, and some workers have found that cuttings from young plants root better than cuttings from old plants. Since young plants are more vigorous than old plants, this seems to contradict the statement made above regarding the superiority of the less vigorous shoots. One should be cautious in drawing conclusions from these results, however, since the vigour of young plants may be due to being planted on a fresh site, in recently fertilized soil, or under better conditions as regards spacing, consequently being less affected by competition than older plants, and not to any inherent quality associated with youth. It may be true that if shoots of a comparable state of development and nutrition are taken from young and from old plants, those from the young plants would root better; but experience nevertheless shows that vigorous, sappy, high nitrogen shoots from young plants do not root so readily as thin, starved, low nitrogen shoots from old plants. Admittedly, a plant in extreme old age may not produce what the propagator would consider ideal cuttings, since the annual extension in growth may be too short; but this does not invalidate the general conclusion that in the selection of cutting material, the vigour of the isolated shoot is a more important factor than the age of the parent plant.

The question of age of material leads to another interesting point namely, the facility with which shoots showing juvenile characters root compared with shoots of the same species showing adult characters. In the Conifers, at least, this must be apparent to many; the surprising thing is that it has been completely neglected in horticultural literature.

When comparable cuttings of *Chamaecyparis pisifera* and the semi-juvenile variety *plumosa* and the wholly juvenile variety *squarrosa* are inserted simultaneously in the same propagating case, the order of rooting is, first, the wholly juvenile variety, then the semi-juvenile variety, and last, the adult. The same is experienced with *C. Lawsoniana* and its semi-juvenile form *Fletcheri*, and the almost completely juvenile form *Ellwoodii*. This has also been noticed in other Conifers. Some years ago at Edinburgh, a pot plant of *Pinus canariensis* which was used for demonstration purposes at forest botany classes became very leggy and it was decided to propagate it on its own roots. Shortly before this, the plant produced from the base a few juvenile shoots (Fig. 109) and these, when inserted as cuttings, produced roots with the facility of *Veronica*, which is most unusual in the genus *Pinus*.

Earlier it was stated that in selecting cutting material, vigour is a more important factor than the age of the parent plant. In view of what has just been said regarding shoots in the juvenile phase, this earlier statement would seem to require further qualification. Where the



From a drawing by Mrs. S. R. Corallodiscus Kingianus

ROCK GARDEN PLANTS

FIG. 98—*Corallodiscus Kingianus* (See p. 277)



THE HOUSE OF VIATCH
FIG 99—*Nepenthes Northiana* (See p 289)



THE HOUSE OF VELTCH

116, 100—*Cypripedium Curtisii* (See p. 289)



Photo, Malby

ROCK GARDEN PLANTS

FIG. 101—*Jankaea Heldreichii* (See p. 277)



Photo, W. Schacht

ROCK GARDEN PLANTS

FIG. 102—*Viola Grisebachii* on slopes of Mt. El Tepe, Bulgaria (See p 280)



FIG 103 — *Campanula Hawkinsiana* (Sec p 278)



Photo, Malby

ROCK GARDEN PLANTS

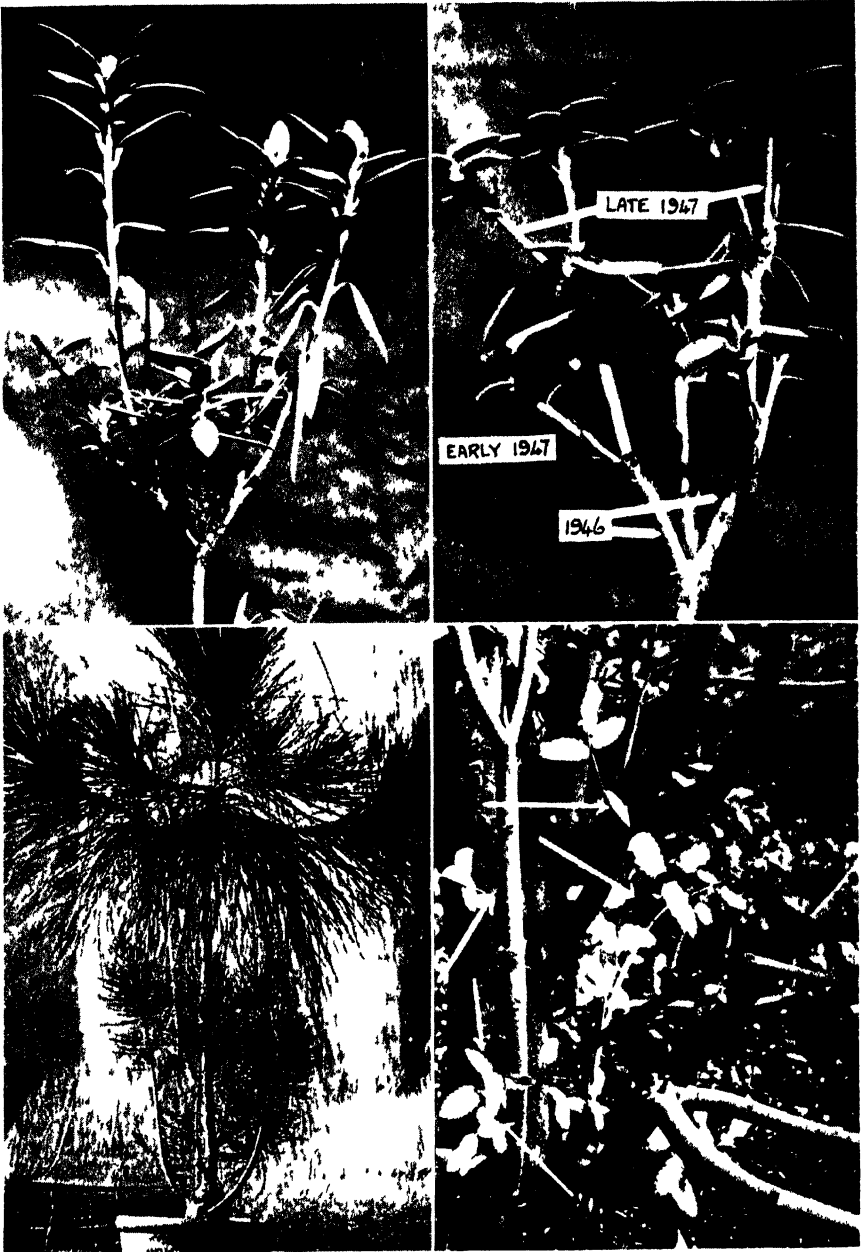


Fig. 105

Above Fig. 105—*Conandron
ramondoides*. A rare Ges-
neriad for the Alpine
house (See p. 278).



Below Fig. 106—*Uthencilla
molli* (See p. 308).



SOME ASPECTS OF PLANT PROPAGATION BY CUTTINGS

- FIG. 107—(top left) *Rhododendron fimbriatum* Suitable cuttings are indicated by the arrows (See p 291)
- FIG. 108—(top right) *Rhododendron lepidostylum* showing two zones of growth produced in the same year This is a common occurrence in alpine *Rhododendrons* in cultivation, not only under our own insular conditions, but in Continental climates also (See p 300)
- FIG. 109—(bottom left) *Pinus canariensis* showing juvenile shoots arising from the base (See p 292)
- FIG. 110—(bottom right) *Eucryphia nymansensis*, the shoots indicated by the arrows make ideal cuttings (See p 293)

SOME ASPECTS OF PLANT PROPAGATION BY CUTTINGS

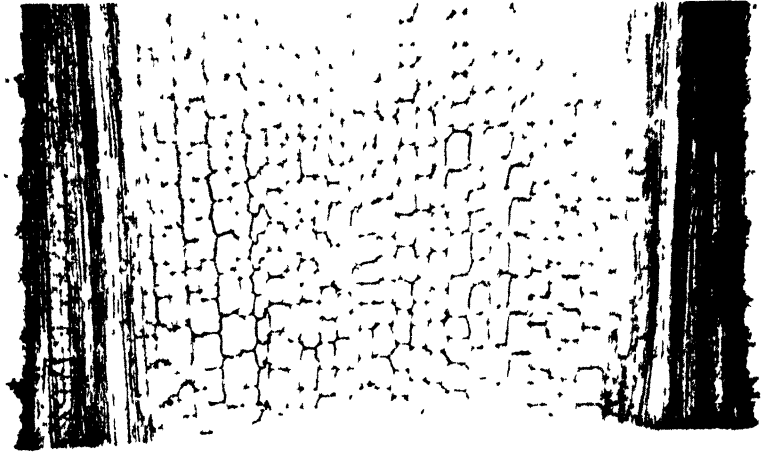


FIG. 111 Longitudinal section through the base of a newly prepared cutting of *Isoloma hirsutum* (See p. 297)

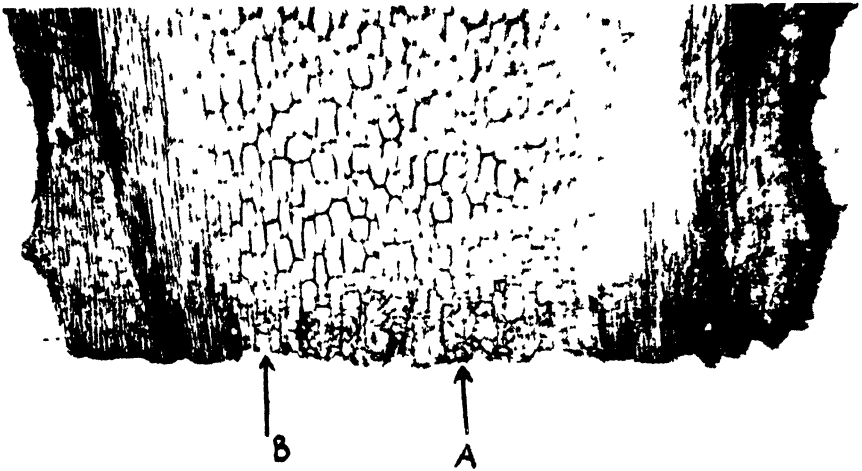
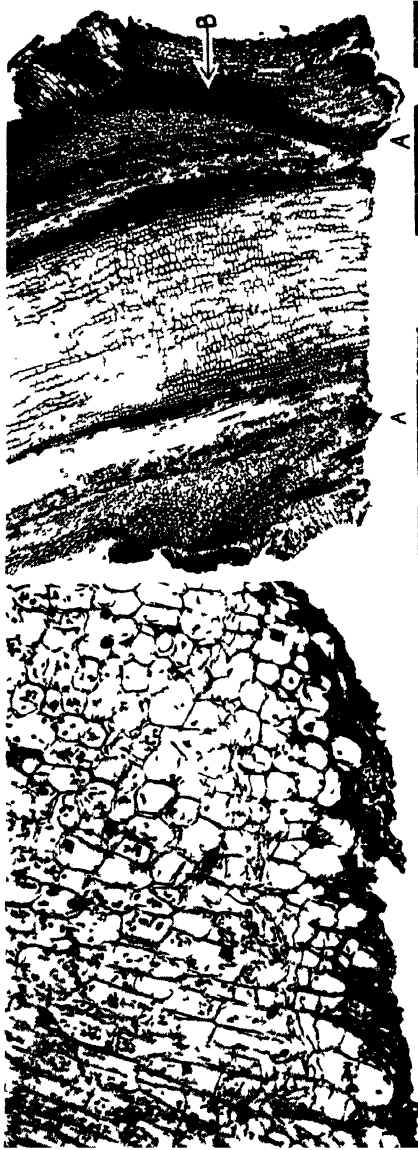
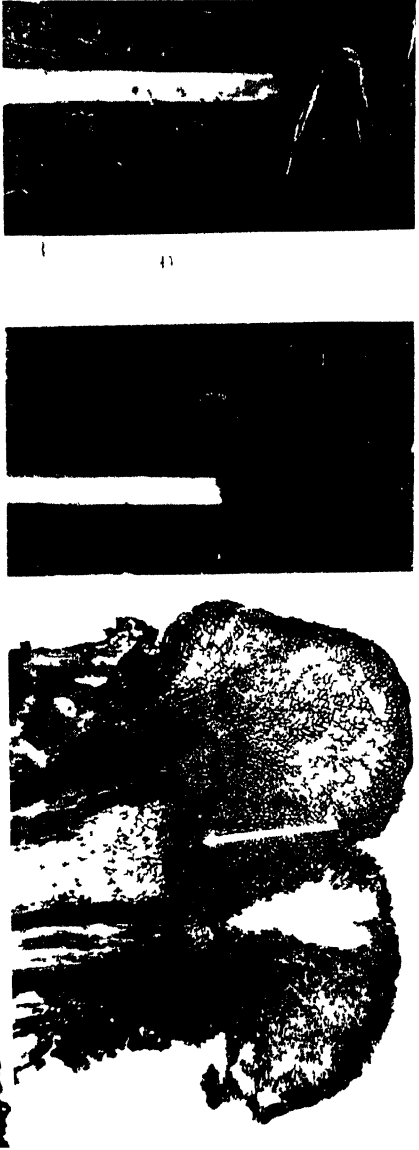


FIG. 112 Longitudinal section through the base of a cutting of *Isoloma hirsutum* after the commencement of healing activity. The suberin layer A is not continuous in the present section, since at the gaps, such as that indicated at B, it has been torn off by the knife during the preparation of the section. Behind the suberin layer the pith cells have become meristematic and are producing transverse walls across their interiors. This type of healing where a phellogen is formed across the pith, is typical of herbaceous stems.

(Suberin is defined as 'the substance of cork, nearly the same as cutin', meristematic tissue is defined as 'nascent tissue, capable of being transformed into special forms as cambium, etc.', phellogen is defined as 'the active cork-producing tissue'. Definitions from 'A Glossary of Botanical Terms' by B. D. Jackson)



16 113 (top left)—Longitudinal section through the basal (distal) end of a Seakale (*Crambe maritima*) root cutting. The initial healing is shown here in greater detail.



16 114 (top right)—Longitudinal median section through the base of a cutting of *I. thurnum* showing the complete occlusion of the wound. Note that the wood cambium shown in the photograph as a dark line and indicated with an arrow has linked up in the centre of the wound.

16 115 (bottom left)—Longitudinal median section through the base of a cutting of *I. thurnum* showing the complete occlusion of the wound. Note that the wood cambium shown in the photograph as a dark line and indicated with an arrow has linked up in the centre of the wound.

16 116 (bottom right)—The soil profile in a hardwood cutting bed showing on the left a cutting inserted in adequately firmed soil of good tilth and where the cutting, in consequence has good contact with the soil water. On the right the effect of inserting cuttings in cloddy open soil is illustrated (See p. 302)

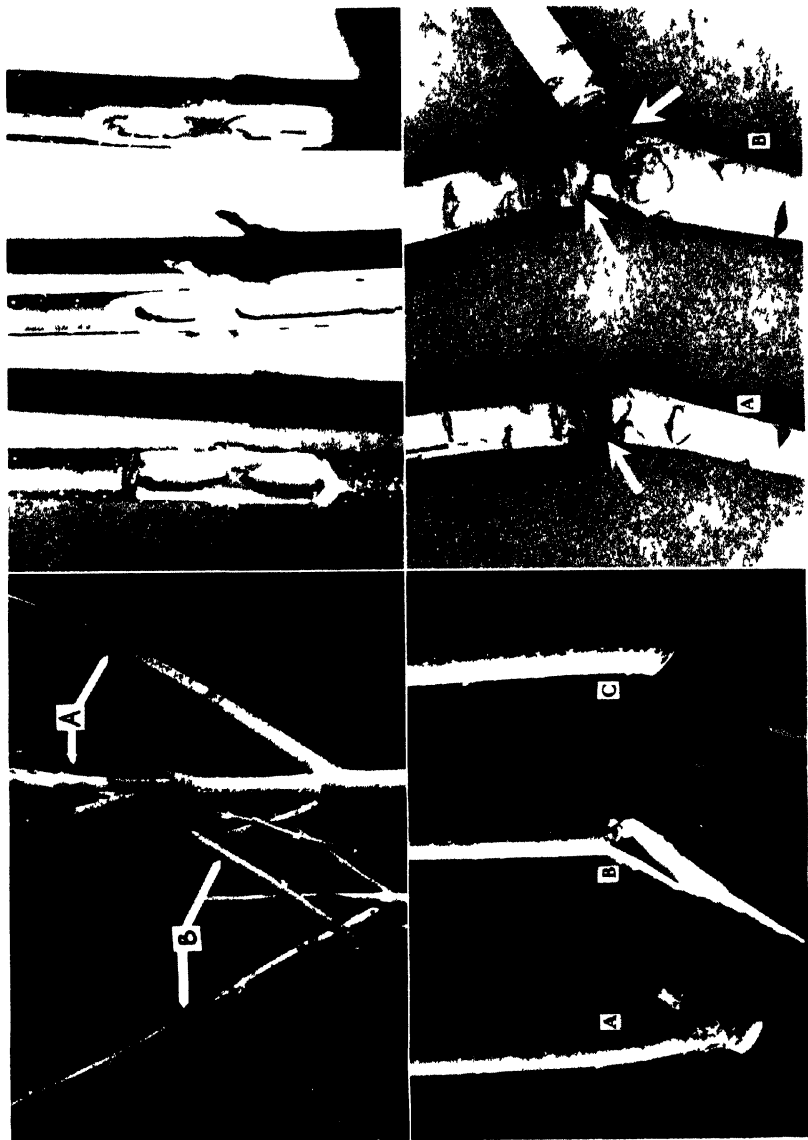


FIG 117 (top left)—The selection of material for hardwood cuttings Forsythia twigs showing A sucker type of growth green in colour which should not be chosen, and B well-ripened shoots brown in colour which make good cuttings

FIG 118 (top right)—One of the shoots illustrated in fig A in section showing the hollow centre Note however that the nodes are solid (See p 296)

FIG 119 (bottom left)—Types of heel cutting A is Hitchcock and Zimmermann type 1, B is type 2, and C is type 3 (See p 299)

FIG 120 (bottom right)—Rhododendron twigs showing zones with bud scale scars at the base of the year's growth From A it will be possible to obtain a cutting between the present and the previous year's wood A similar cutting is also obtainable from the apical shoot of B and a heel cutting from the lateral shoot The cuts should be made at the position indicated by the arrows (See p 300)



From a drawing by A. J. Wille

NEW AND NOTWORTHY PLANTS

FIG. 121—*Camellia (reticulata saluensis)* Inamoratí (See p. 253)

juvenile phase of growth is retained in the young plant for a brief period only, the age of the parent plant in these cases is undoubtedly a more important factor in the selection of cutting material than the state of vigour of the shoot, i.e., where the selection of juvenile material is *ipso facto* the selection of shoots from young plants. Where, as in some Conifers, however, the juvenile phase ceases to become associated with young plants only, and may be continued into old age, then the presence of juvenile characters gives no indication whatever regarding the age of the plant. For practical purposes, the significance of this is that shoots in the adult phase from young plants will not root so readily as shoots with juvenile characters from old plants. In other words, in the selection of cuttings, the presence of juvenile characters in the isolated shoot is more important than the age of the plant from which the shoot is taken.

In all these Conifers mentioned above, shoots in the juvenile phase differ from adult shoots in so spectacular a manner as to make them easily recognizable. The same applies to plants which, in the adult phase, show xerophytic adaptations like *Ulex*. This leads one to ask if it is possible that other plants, which do not show xerophytic or other leaf modifications of so pronounced a character, have, in fact, a distinct juvenile phase of growth, which, since it is less spectacular, may not be so easily recognized. In this connection, it is interesting to note that one worker has identified a juvenile phase of growth in Apple characterized, at least as far as outward appearances are concerned, only by the leaves being thinner and less pubescent than leaves in the adult phase. Cuttings from shoots in this phase, in these Apples also, showed a marked superiority over adult shoots as regards rooting qualities.

There still remain to be mentioned several other phenomena which have important influences upon the choice of material for cuttings. For instance, it is fairly widely known that stool shoots (i.e. shoots from plants cut back to ground level), despite the fact that these may sometimes be fairly stout, root much more readily than cuttings obtained in the normal manner. There is no satisfactory explanation for this, but these shoots may be juvenile in character. It will be remembered that the shoots which arose at the base of the plant in *Pinus canariensis* were also juvenile in character, and the shoots which arise from the stumps of *Ulex* bushes after heath fires are also juvenile. There may be some connection between the above observations upon juvenile characters and the fact that the shoots which arise from the bases of many woody plants make good cuttings. Some such shoots are shown in Fig. 110. But it should be borne in mind that this growth is produced usually under conditions of dense shade, and with no exceptions at present known to the writer, shoots grown in shade, irrespective of their point of origin, root much better than shoots grown in full illumination. It is well known that shoots root readily when the bases are grown in complete darkness, i.e. etiolated; but that poor illumination also results in better rooting when the shoot is subsequently isolated does not appear to be widely known.

There remains now but one other important point to mention in

connection with the selection of soft-wood cutting material. A common horticulture practice with plants difficult to root is to pot them and bring them under glass, usually to a warm, moist atmosphere. This is one of the most successful methods for inducing difficult plants to root, but the reason for its efficacy has yet to be discovered. One worker has suggested that the superiority of the cuttings taken from these plants is due to the fact that the root run of the parent plant is restricted. There is no doubt that pot-bound conditions will produce thin, starved, high carbohydrate/nitrogen ratio shoots which would make ideal cuttings; but if this were the only reason, it would not then be necessary to transfer the plants indoors. There seems to be little doubt that the root restriction may have some bearing upon the greater facility with which these cuttings root, but the chief advantage is undoubtedly connected with the softer type of growth produced under glass, since cuttings taken from pot-bound plants still remaining outside show no similar spectacular increase in rooting qualities. It may be that such growth approaches in character growth in the juvenile phase. For instance, some hardy plants with xerophytic adaptations produce juvenile shoots under moist, warm conditions. It should not be overlooked, however, that plants so housed begin to grow earlier than similar plants out of doors. The cuttings have, therefore, in deciduous plants, a longer photosynthetic period before leaf-fall: this aspect is very important. But in some deciduous species, the ultimate survival of the cutting depends not only upon its having time to produce roots before normal leaf-fall, but actually to produce additional shoot growth as well. The dying off in *Stewartia* and in late-rooted *Viburnum grandiflorum* and *V. furcatum* after the cuttings have been rooted and potted up is a common experience. The cuttings usually survive as long as the leaves are present, but after normal leaf-fall a number of them die. If, however, they can be induced to produce new shoot growth before leaf-fall, they survive the winter satisfactorily, despite the fact that the leaves produced with the additional growth fall at the normal time. This is a phenomenon difficult to account for, but it may be that the additional growth results in the accumulation of greater food reserves. It must not be assumed, however, that these remarks apply to soft-wood cuttings of all deciduous shrubs; on the contrary, in the majority, survival over the winter is not dependent upon having produced additional shoot growth immediately after rooting.

Earlier reference was made to the growth produced by plants which are potted and placed indoors. The term "soft" used in describing this growth refers to the character of the shoot rather than to its state of maturity. In this respect, such growth resembles closely juvenile shoots, shoots grown in shade, stool shoots, and etiolated shoots, all of which, as has been pointed out, root more readily than normal shoots. There is at present no satisfactory explanation for this phenomenon. The increased rooting which takes place in etiolated shoots of Camphor has been attributed to the reduction of fibrous tissue in the cortex; but as PRIESTLEY pointed out, this may explain the emergence of roots, but it does not explain their initiation. In all the numerous rooting cuttings examined microscopically by the writer, not one instance has been

found where a root has been prevented from emerging by structural features in the cortex. These emerging roots quickly push aside or rupture any obstruction.

In view of what has been said regarding juvenile shoots, it would seem advisable to avoid, in selecting cutting material, shoots which are the extreme opposite of juvenile shoots, namely flowering shoots.* In many easily rooted species, the selection of flowering wood does not affect the rooting qualities to any appreciable extent, and in the majority of the others, flowering shoots do not constitute what the propagator would regard as ideal cutting wood; but where the labour in the plant-propagating department is unskilled or not really widely experienced, then it should certainly be made a definite rule not to take flowering wood.

Another important point in the selection of softwood cutting material is the time of isolation. If one of the better horticulture works, such as NICHOLSON'S *Illustrated Dictionary*, is consulted on this matter, it will be found that the following advice is given for almost every shrubby genus: "Cuttings of half-ripened wood will root under a bell-glass." There is no doubt that given the appropriate temperature, moisture, and rooting medium, if the cuttings of the plant will root at all, these are the conditions under which they will root. Generally, the terminal bud of the cutting should be formed and the base should be just beginning to ripen (lignify). There is a point which does not appear to be generally known. The cutting season may be started earlier, and consequently, fuller use of the indoor propagating cases may be made by taking shoots before the terminal bud has been formed; the soft, still developing tip, which would become flaccid in any case, is cut off when the cutting is being prepared for insertion. This is a convenient practice with those deciduous species which require a long time to root, since if they do not root before leaf-fall, the subsequent number which will root before the leaves appear again in spring is negligible and certainly does not justify their retention in the propagating cases until then. The case could be filled more profitably with evergreens such as *Ericas* and *Conifers*. But there are the inevitable exceptions to this rule also and one of these is *Cornus florida* which often roots after leaf-fall. Furthermore, the tips of cuttings may also be removed where, in using heel cuttings, the whole of the current year's growth is too long. It is sound practice when cuttings require shortening, never to shorten them from the base but from the apex. No instance is known to the writer where the tips of shoots root better than the basal portions. It should also be borne in mind that in species having pre-formed root initials, there are more of these at the bases than at the apices of shoots, and that the food storage content of the shoot also decreases from base to apex.

Before leaving the subject of softwood cuttings, it should be noted that vigorously growing shoots may be induced to produce suitable cuttings by having the growing point of the still developing shoot pinched out. The resulting two or three shoots which develop make ideal cuttings, and this is difficult to explain. The resulting cuttings

* It should be noted, however, that some *Conifers* produce cones on juvenile shoots.

are much less vigorous, at least in the earlier stages, and the better rooting may be attributed to the lower nitrogen/carbohydrate ratio, since the two or more shoots which are produced after pinching share the nitrogen supply of the decapitated leader.

In describing the material which makes ideal softwood cuttings, the advisability of using starved shoots was emphasized. In hardwood cuttings, on the other hand, which are inserted in the open ground usually in autumn, fairly stout shoots are chosen. At first sight, this seems to be contradictory to almost everything which has been said regarding softwood cuttings, and to most people this seemingly contradictory advice is very puzzling. When the subject is examined more closely, however, it will be apparent that this is not so. Although fairly stout shoots are recommended, here also the high nitrogen, sucker type of growth should be avoided. These high nitrogen shoots have usually a large pith and they are often completely hollow (Figs. 117 and 118). They are usually green in colour, whereas the ideal, well-ripened cutting wood is brown. They also have a low food storage content, and the presence of adequate food reserves is extremely important in hardwood cuttings. But let us pursue this question of the nutritional status of the shoot further, for it is in this connection that we will reconcile the present advice with that given earlier for softwood cuttings. With hardwood cuttings also, there seems little doubt that thin, nitrogen starved shoots would also give better results, provided that—and this is the critical point—the food storage capacity of the cutting is sufficient not to carry on the metabolism of the shoot until spring, but actually to begin at least the production of shoots and leaves at the normal time. This is important, since in hardwood cuttings, at least under horticultural conditions, roots only appear after the buds begin to grow. The necessity for a high food storage content in softwood cuttings does not arise, since there are still leaves present with which food material can be made; and furthermore, at the time of isolation in June or July, there is still time for the cuttings to become established and store food material before leaf-fall.

It has been mentioned that if softwood cuttings of deciduous species lose their leaves before rooting, their further retention in the indoor propagating case is merely a waste of valuable space. This can also be explained from a nutritional standpoint. The important point to remember is that the production of roots in spring is closely associated with the production of shoots. But unlike the hardwood cutting, isolated from the parent plant in autumn, in the softwood cutting certain vital processes have already been initiated, one being the production of callus tissue. This proceeds rapidly in the higher temperature of the propagating case until the food material in the cutting becomes exhausted, usually long before spring. In fact, many of these cuttings produce enormous masses of callus tissue. The hardwood cutting in the lower temperature out of doors, on the other hand, if inserted in October produces slowly during the winter callus tissue to occlude the wound, a process which is rarely well begun when the buds begin to grow in spring and the roots are produced subsequent to this. Thus unlike the softwood cutting, the food supply

in the hardwood cutting is not exhausted before shoots and subsequently roots are produced.

THE PREPARATION OF THE CUTTING FOR INSERTION

But even if the best of material is selected, results may not be satisfactory in some plants if the cutting is improperly prepared for insertion. Everyone must be familiar with the so-called "damping-off" in softwood cuttings during the first few days after insertion—the blackening and death of the stem from the base upwards. The actual cause may be fungal or bacterial action, or oxidation of the tissue brought about by absence of healing. This may be caused by a blunt knife; a crushed instead of a cleanly cut wound; a torn wound surface or a wound made in the wrong place. In order to emphasize the importance of making cuttings properly—and in many cases the efficiency with which this operation is performed makes all the difference between success and failure—some microscopic sections have been photographed and these illustrate this point better than a written description. (See Figs. 111–115.) In a great many cases, the inducing of difficult plants to root is merely a matter of obtaining healing at the wound in the first instance. For example, *Populus Wilsonii* is generally regarded as being notoriously difficult to root, yet *P. lasiocarpa* which has shoots of comparable thickness roots readily.* The limiting factor in the rooting of *P. Wilsonii* is the poor healing of the wound, which in *P. lasiocarpa* takes place readily. If cuttings of *P. Wilsonii* can be induced to heal, rooting will take place eventually, and this is true of many difficult plants.

When the cutting is being prepared, the shock of wounding causes the air spaces in the cellular tissue to become filled with sap, so that there is at the wound a continuous surface of sap and mutilated pieces of tissue. Fatty substances from the neighbouring tissue float to the surface of the sap, and provided the rooting medium is sufficiently aerated, these substances dry and oxidize, forming a varnish-like layer of suberin over the cut surface. If this layer does not form, no subsequent healing will take place. If the cut is made cleanly, this protective film will form readily; but if, on the other hand, there is much crushed and mutilated tissue, the film may not form readily and micro-organisms may gain access or the cutting may begin to disintegrate.†

Although the nature of the cut is often very important, the position where it is made may be equally important. This position is determined by the structural peculiarities of the shoot and by the subsequent behaviour of the shoot tissue exposed. Four types of cutting are distinguished by the position at which the cut is made namely, nodal cuttings, internodal cuttings, heel cuttings, and cuttings made between the wood of the present and previous year. As will be shown later, the latter two are structurally the same.

* There is no satisfactory explanation for the fact that in many genera, e.g. *Rhododendron* and *Camellia*, the thick-stemmed species are more difficult to root than the thin-stemmed species. It is not, in *Camellia* at least, the thickness of the shoot in itself which inhibits rooting, since leaf cuttings isolated with the axillary bud at the base are also difficult to root.

† No doubt the WENT school would also add that the absence of suberization allows the rhizocalin to leach away into the rooting medium.

In horticultural practice, the commonest type of cutting is the nodal cutting. Nodal cuttings should not be cut through the node, but a little below it. In most plants this position is indicated by an outwardly visible swelling associated with the leaf insertion which occurs in the stem below the pulvinus of the leaf. The cut should be made where the swelling ends, since the plexus at the junction of the leaf trace with the vascular system of the stem, which is a source of great meristematic activity, will thus be retained at the wound surface. Healing is usually better when the cut is made at the node. In hardwood cuttings, the close association between bud activity in the spring and the subsequent production of roots has already been mentioned, and it is a fact that cambial activity re-commences in the neighbourhood of buds and proceeds down the stem. As SLEDGE has shown, however, the presence of a wound is a much more important factor in causing cambial activity than the presence of buds. The reason why nodal cuttings are generally most satisfactory are :—

1. Pith is usually absent or at any rate smaller at the node, and in many hollow shoots the nodes are often solid. (See Fig. 118.) These are the more important points.
2. There is just below the node, as has been mentioned, already the additional meristem associated with the plexus at the junction of the leaf trace and the stem vascular system. If a leaf at the base of a cutting which has commenced activity is pulled off, the tissue which has become active is usually removed with the leaf, thus showing that it is the tissue connected with the leaf trace which first becomes active. (See Fig. 114.)

In at least one horticultural work, it is stated that better results may be obtained in certain plants by making the cut some distance above, and in other plants some distance below the node. The plants referred to all belong to the easily rooted category and it is doubtful if it is worth while making exceptions to the usual practice for these subjects. In the majority of cases, the advantage claimed as a result of varying the position of the cut is that the roots produced are those from pre-formed initials, i.e. the position of the cut apparently being determined by the locus of the majority of the pre-formed root initials. By varying the position of the cut, it is also claimed, more roots may be produced. It is doubtful if additional roots over a certain minimum constitute any advantage, as indeed seems to be evident when using some of the chemical aids to rooting. Many of the prodigious number of roots so produced eventually die and the growth of the plant does not seem to be adversely affected in consequence. Similarly, although the writer has never carried out experiments in this connection, any correlation between the number of roots produced and the subsequent vigour of the plant has never been observed. It seems reasonable to assume that one root which produced, say, three branch roots, would function as efficiently as three roots originating from the base of the cutting. The problem, as the writer sees it, is not to produce a few additional roots in plants which will root in any case, and seem to succeed quite well on the few roots which are formed; but to develop efficient

horticultural methods which will enable the more difficult plants to be rooted. And in order that this may be achieved by all types of labour in the establishment, skilled and unskilled alike, to standardize the methods as far as possible where such standardization is still compatible with the procurement of satisfactory results.

As regards heel cuttings, in the literature there seems to be some confusion in the nomenclature of the different types. For practical purposes this may not seem a matter of great importance provided one knows the type which gives best results; but for experimental work, it is necessary that each type should be precisely identified. HITCHCOCK AND ZIMMERMAN* carried out experiments in which they used the following types of heel cutting :—

1. Cuttings containing a mallet of the previous year's wood (Fig. 119 A);
2. Cuttings containing a heel of the previous year's wood (Fig. 119 B);
3. Where the cut was made exactly at the base of the current year's wood (Fig. 119 C);
4. Where the cut was made from $\frac{1}{4}$ to $\frac{3}{4}$ inch above the base of the current year's wood.

Types 1 and 4 have not been observed in horticultural practice in this country. Type 2 is commonly used, however, and it is not known why. It has never been clear to the writer what possible advantage the retention of a piece of old wood at the base of the cutting could possibly have, although a disadvantage, in that the wound takes longer to occlude can be readily seen. The only instance where the retention of a piece of old wood is recommended is where the pith or a hollow stem may be exposed by removing it. No case where this occurs is known, but there may be such cases. The most successful type of cutting is HITCHCOCK AND ZIMMERMAN's type 3 (Fig. 119 C), where it will be observed that the wound has been made obliquely. If it were made transversely, however, the pith would be exposed; or where the stem is not solid, the centre of the wound would be completely hollow and this may lead to the internal disintegration of the cutting. In horticultural practice, one sometimes observes sloping cuts being made at nodes also. Perhaps the assumption that this practice is also efficacious if applied to nodal cuttings may have originated by someone observing that the oblique cut in the heel cutting is more successful than the transverse cut. Having observed this, it may have been concluded that the nodal cutting would also be more successful if treated in this way. It is easier to make a clean cut at a slope.† This is certainly true of hardwood cuttings where the stroke of the knife is made away from the operator. It should be remembered that hardwood cuttings of many plants will grow if made with a hatchet, but here we are discussing the matter with the object of finding a technique which will be successful in all plants, the difficult as well as the easy.

At Edinburgh, we have hitherto described as a heel cutting a shoot pulled off or better still cut off the parent plant as in HITCHCOCK AND ZIMMERMAN's type 3. But cuttings containing a piece of the previous

* *Contrib. Boyce Thompson Inst.* 4 (1932) 85-98.

† This point was mentioned by a member of the audience.

year's wood have also been described as heel cuttings. In order to distinguish between these two types, the term "trimmed heel cutting" is suggested for HITCHCOCK AND ZIMMERMAN's type 3.

From their experiments, HITCHCOCK AND ZIMMERMAN concluded that the mallet type of cutting was generally poor and type 3 generally good. They also mention, however, that no one of the four types was consistently good in all the species which they used in the experiment. Some of the results which they obtained seem inconsistent with horticultural practice, at least in this country; but some of the apparent inconsistencies may be explained. For example, there is the instance where mallet type cuttings of *Diervilla* and *Cornus florida* taken very early in the season were better than type 3 cuttings also taken at the same time. A few years before the war this experiment was repeated at Edinburgh and approximately similar results obtained. One day, the explanation of this previously puzzling result suddenly occurred to the writer. Very early in the season, the current year's shoots of *Diervilla* are too young to function independently of the parent branch. In the mallet cuttings, on the other hand, a number survived and eventually rooted since the food material in the piece of parent branch, isolated with the cutting, sustained them until the roots were formed. In other words, the mallet cuttings taken early in the season were really bud cuttings with the bud advanced into growth. It should be mentioned, however, that nodal and type 3 cuttings, taken at the normal time when the base of the current year's shoot is beginning to lignify, root much better than mallet cuttings.

Another type of cutting which is often used, especially in *Rhododendron*, is where the cut is made between the present and previous year's wood. Structurally, the base of this cutting is the same as a heel cutting, except that sometimes the pith area is not so small. Both shoots have their origin in resting buds; the one from the apical bud, and the other which is usually termed the heel cutting, from a lateral bud. Both shoots, as a result, have at their bases the bud scale scars (Fig. 120). In addition to the absence or great reduction of pith at the wounds, probably the presence of the meristem associated with the bud scale traces explains the general superiority of heel cuttings and cuttings taken between the present and previous year's wood over other types of cutting. The cutting taken between the present and previous year's wood is the usual type obtained from shoots of *Rhododendron* which have not produced flowers (Fig. 120 A), or from any shoot which grows monopodially. Sometimes two zones of growth are produced during the same year in the dwarf *Rhododendrons*, but this does not affect the structure of the basal part of the shoot since a definite resting bud is formed between the two zones of growth (Fig. 108):

It has just been stated that cuttings taken between the present and previous year's wood (i.e. a current year extension of an existing axis), and a heel cutting (i.e. a current year branch shoot), originate in resting buds and have, therefore, basal zones with bud scale scars. Although this is true of most plants handled in horticulture, it is not true of woody, tropical rain forest plants such as *Clusia*, *Fagraea*, *Rheedia*, *Rudgea*, and many others, which have no resting buds. It follows,

therefore, that cuttings taken between the present and previous year's wood, and having a zone of bud scale scars at the base, cannot be obtained from these plants. Such cuttings, if indeed it were always possible to separate one year's growth from the next, would be the same as nodal cuttings. Heel cuttings can be obtained from branch shoots, however, but here also, since these have not developed from resting buds, basal zones showing bud scale scars will not be present.

ROOTING MEDIA AND THE HANDLING OF ROOTED CUTTINGS.

Let us deal first with the softwood cutting. When the cutting is isolated from the parent plant, it is deprived of its water supply; but the leaves continue to transpire water, and as has been pointed out already, food material continues to be manufactured and the leaves require water for this also. This water can only come from the rooting medium. It is true that certain plants like the *Bromeliaceae* take up water through the leaves: the roots of some of these plants—where roots are present at all—are merely anchoring organs. Perhaps others are also able to take up moisture in this way, but the majority of isolated rootless shoots take up water through the part of the cutting which is in contact with the rooting medium. In fact, it is on record that workers have caused wilting in cuttings by using lanoline as a vehicle for growth substances. But the point which concerns us is that this method of taking up water is not so efficient as intake by the roots, and if the cutting is not to become flaccid, water loss through transpiration must be minimised. This may be achieved either by reducing the amount of leaf surface on the cutting by mutilation, or by providing a moist atmosphere in the propagating case. The importance of leaving the leaves intact, as far as is compatible with the maintenance of turgidity in the cutting, has been demonstrated by experiment many times. It is sound horticultural practice to solve the problem of wilting cuttings by methods other than mutilation; for example, by creating a more humid atmosphere in the propagating case, or by reducing the light intensity which will appreciably lower the rate of transpiration.

But the supplying of water is not the only function of the rooting medium. If it were, it would be sufficient merely to place the cuttings in water. Some species will root under this condition, provided that the water is sufficiently aerated. This leads to another important function of the rooting medium, namely, the supplying of air. The importance of making a clear cut at the base of the cutting has been mentioned, but most plants have a remarkable capacity for healing badly mutilated surfaces, and there is not the slightest doubt that the most important factor in the healing of wounds is a supply of air at the wound surface. A badly cut cutting in a well-aerated medium may subsequently heal, but a cutting where the wound surface is constantly bathed with water will rarely heal. The fatty substances at the wound, instead of drying and oxidizing, merely leach away and no healing takes place: the cutting then begins to blacken and die from the base upwards. From these remarks then, it becomes apparent that the air/water relationship of the rooting medium, whatever its nature, must be nicely balanced. This relationship, in the case of sand, is determined by the

size of the particle; coarse sand holding too little water, and fine sand holding too much. One reason for the success as a rooting medium of the Bedfordshire quartz sand of horticultural commerce is the ideal size and shape of the particle. Since in the last few years vermiculite seems to have been tried as a rooting medium, it would be as well to point out that it is not only the size of the particle which may determine the air/water relationship of a rooting medium of this nature, but also the porosity of the particle. For instance, since 1932 granulated pumice has been used as a rooting medium at Edinburgh. The pumice particle is nearly the same size as the sand particle, but physically, the two substances are widely different. The pumice absorbs water like a sponge and does not dry out so quickly as the sand; consequently, it requires water much less frequently. It is an excellent rooting medium for subjects difficult to heal.

Unlike softwood cuttings, hardwood cuttings, as has been mentioned already, have to be large enough to survive the winter; and the external factors, moisture and temperature, are beyond the control of the propagator. The only thing he can do, if there is any choice in the matter, is to insert the cuttings in sandy soil. One very important point regarding hardwood cuttings must be mentioned, namely, adequate firming of the soil. Lack of this causes nearly all the casualties in these cuttings—casualties which may be greatly reduced by a thorough firming, not only at the time of planting when it is less important owing to winter rains, but after frost lift, and in any case in spring just before the buds begin to move. There are heavy demands upon the cutting for water at that time, and since the roots do not form until after shoot growth has commenced, all the water is obtained through the part of the cutting which is in actual contact with the film of water on the soil particles. The good results obtained with hardwood cuttings in sandy soil may be due chiefly to satisfactory aeration, but there is no doubt that soil of a cloddy nature would allow the cutting less complete contact with the soil, and consequently with the soil water. This is clearly illustrated in Fig. 116.

Before closing, a point which causes many losses in softwood cuttings should be mentioned, namely the potting of rooted cuttings too deeply. These casualties seem to be caused chiefly by poor aeration after the excellent aeration of the rooting medium, but there may be other causes. There may be some analogy between this phenomenon and the dying of a tree when the basal part of the bole is buried with soil.

A point in these notes which is likely to evoke criticism is reference to the correlation between bud growth and root formation in hardwood cuttings, worked out by VAN DER LEK,* and which has been used here to explain several phenomena. PRIESTLEY AND SWINGLE,† referring to this work, stated: "It seems necessary to reserve an opinion as to the relation between bud development and root production . . . For continued root development a shoot system developing in the light is

* *Meded. Landbouwschool, Wageningen, XXVIII (1924)** English Summary. pp. 211-230.

† *Tech. Bull. No. 151, U.S. Dept. of Agr., Washington (1929), p. 70.*

essential, but the connection between the just emerging bud and root initiation at the base of the hardwood cutting is far from firmly established." This is the sort of *impasse* which is frequently encountered in work of this nature. What are the facts of the matter which concern the horticulturist? As this is being written (March 28, 1948), there are outside the window in a piece of experimental ground, cuttings of 45 species, varieties and hybrids of *Philadelphus*; 32 *Deutzias*; 33 species of *Ribes* (excluding 10 varieties of Gooseberry and 5 varieties of Red Currant); 12 species of *Populus*; 21 *Diervillas*; *Forsythia*, *Cornus*, and many others. In the present spring, which is early, the buds of most of these cuttings are already advanced into growth, and after examining earlier in the day a representative sample of each, not a single root was found. This has been observed many times before, but the present cuttings have been kept under very close observation. It is clear that under horticultural conditions, root formation in hardwood cuttings does not always follow bud development as a matter of course. Sometimes there is a considerable time lag between the commencement of bud growth and the production of roots, an occurrence which is more noticeable than usual during the present early spring. Hitherto, this occurrence has been attributed by the writer to the difference between the air and the soil temperatures with the resulting quicker metabolic rate at the top than at the base of the cutting. This assumption seems quite reasonable, since flagging in glasshouse crops may be caused when the air temperature becomes too warm in relation to the soil temperature, with the consequent quicker metabolic rate at the top than at the base of the plant. However, this theory could be tested by placing the bases of hardwood cuttings in warm conditions and the tops in cold conditions simultaneously. But what are the facts inconsistent with the statement that there is a close connection between the emerging bud and root initiation? PRIESTLEY AND SWINGLE's doubts in the matter were occasioned by the behaviour of the cambium in isolated pieces of budless internodal shoot.* The present writer entertained the theory tentatively since it explained so many otherwise puzzling phenomena observed in the cutting frame, e.g. the falling off in rooting of deciduous cuttings after leaf-fall, and also since no occurrences inconsistent with it have been observed. In preparing material for the present lecture, however, to demonstrate the necessity of oxygen not only for healing in cuttings but also for subsequent root production, ZIMMERMAN's† experiment with Willow cuttings in water was repeated. In the present case, shoots of *Salix vitellina pendula* were isolated on November 18, 1947, and put in glass tubes containing water which were then placed upon the staging of a tropical house in full illumination, where the minimum night temperature was 65° F. Root production in these cuttings preceded bud activity, at least outwardly visible bud activity. Upon observing this, the writer again consulted VAN DER LEK's paper

* "Cambial activity at the base is certainly essential to root initiation in this region, but the activity may be quite independent of the bud, as indeed is shown very clearly by experiments with internodal cuttings carried out in winter with short shoot pieces in which the cambium is still dormant." *Ibid.* p. 70.

† IX Internat. Hort. Congress, Roy. Hort. Soc., London (1930), *Report and Proc.*, p. 170.

and found that although the majority of the cuttings used by him were isolated in the early part of the year, one set of *Vitis vinifera* cuttings were isolated in the autumn before they had had a period of rest. The buds in this case did not move for some time and had apparently no effect upon the developing roots; completely budless cuttings also developed roots. Again, at the end of January, 1948, a member of the staff of the Royal Botanic Garden was observed with a bundle of twigs of *Salix daphnoides* which had rooted abundantly; and while the shoots bore a heavy crop of catkins, no outwardly visible vegetative bud activity was observed. The twigs had been isolated on December 22, 1947, and had been placed in a water tank in a tropical plant house. It should be noted that in the two instances of root production before vegetative bud activity in *Salix* at Edinburgh, and in VAN DER LEK's experiments as well, the temperatures of the rooting media and the air temperatures at the tops of the shoots were, if not exactly the same, certainly not widely different. Any retarding effect upon root production as a result of low temperature in the rooting medium does not therefore apply in these cases.

The writer was inclined in the first instance to attribute the behaviour of the *Salix vitellina pendula* cuttings to a more marked resting period in the shoot than in the root. However, VAN DER LEK had also considered the question of periodicity and mentioned that the regeneration process is independent of it, as the cuttings of *Vitis* showed. In this connection he quotes SIMON whose remarks are translated and more fully quoted below.* However, although all this leads one to suggest that the time lag between bud activity and root production in the hardwood cutting in spring may be reduced by pre-treating the basal part in a high temperature before insertion, it only makes more difficult the explanation of the almost complete cessation of root production in softwood cuttings of deciduous species after leaf fall. It may be that when the leaves fall, the food storage content without additional photosynthesis is insufficient to produce roots, but most of these cuttings make large masses of callus, as indeed would be expected from the remarks by SIMON below.

Although many of the problems in this branch of horticulture could only be handled by the physiologist, or better still, by close collaboration between the physiologist and horticulturist, there is, nevertheless, much work to be done by the horticulturist alone in investigating the whole technique of handling cuttings. This, however, is a whole time task for an able team, a task whose object should be not only to test the efficacy of existing methods and to search for better, but also to discover the most suitable standard types of structure for propagation purposes. In other words, the subject requires handling

* "A pronounced autogenous rest period could really only be established in the buds and as regards increase in thickness. Certainly as far as root growth is concerned, the rest period is only partial, and finally, in all wound reactions, regenerative activity (in callus, etc.) and such like, its occurrence could not be substantiated at all The wound reactions are inducible during the whole rest period. This is especially striking in callus formation from the cambium, since when functioning normally this meristem exhibits a strongly developed rest period." Untersuchungen über das Verhalten einiger Wachstumsfunktionen . . . während der Ruheperiode. *Jahrb. für wiss. Bot.*, 43 (1906), p. 34.

in the manner in which potting shed practice has been handled at the John Innes Horticultural Institution.

An expression of thanks is due to MISS E. R. STOTT for preparing the microscopic sections, and to MR. S. F. HAYES for instruction in the use of the micro-camera. The photographs were taken by the writer.

NOTES FROM FELLOWS

Winter Gardening in America

I WAS interested to read MISS HESS's notes on winter gardening around Philadelphia. However, I would like to say she does not give the complete picture. There are, of course, gardens where gardeners, usually European in training and education, try to reproduce the scenes they knew and grew at home with the results pictured by MISS HESS. But here in the Hudson valley and the hills between our noble river and the Sound there are many gardens which are charming all the year with not a plant bundled up in straw or slatted wood.

To achieve winter effects of a cold region it has always seemed sensible to grow mainly the plants which are perfectly hardy and there are a great many. For large effects we have the Yews in the various forms, *Leucothoes*, *Pieris*, the *Kalmia latifolia*, evergreen *Rhododendron* hybrids, *Stransvesia*, *Euonymus*, certain of the *Berberis*, such as *candidula*, *Chenaultii* and *verruculosa*, certain of the *Hollies* such as *glabra*. We use tree box and Korean box which does not need to be protected. Then there are a great many native low plants charming as ground covers; some require a very acid soil such as *Epigaea repens* and *Gaultheria procumbens*. But the low shrub *Ilex crenata* var. *Helleri* does not nor does *Vinca minor* or *Pachysandra terminalis* (which can be easily overdone). *Mahonia repens* is a lovely low evergreen, and *Pachistyma terminalis* is green and flat to the ground with its long trailing stems. *Vaccinium Vitis-Idaea* is handsome and spreading, and a charming low shrub is *Leiophyllum buxifolium*.

Then, too, the description of the seasons are a bit drastic. Some years we can garden, that is plant right into December and get our Sweet Peas and early edible Peas into the ground by mid-March. Instead of using dry hop manure or anything quite so unsightly, we use thoroughly rotted compost as a mulch, which besides looking well enriches the soil. I have never found it necessary to cover any of the perennials I grow, in my thirty-five years of gardening. Winter hardiness is helped along by certain practices. It is unwise to plant so late that the plants cannot become established and it is wise to have the garden very well drained. Late pruning is also to be avoided for an unexpected warm spell coming in November might start growth which is certain to be killed off.

All this does not mean that gardening in the Eastern United States is as easy as in England. Though I think every section has its problems and the fun is to meet the challenge.

HELEN M. FOX

Foxden, Peekskill, New York.

America in June

After a cold spring and lack of sunshine, which is very unusual in May and June, there was not a Rose out when I flew back on June 12. The Horticultural Show at Boston had to rely on Iris alone, although MR. GRUPPY of Melrose managed to show six Paeonies brought on under glass. One was exceptional, a large pale coral-pink single with a gold centre. Here are the names of the Iris that pleased me most: 'Lady Grey,' tall white with falls of perfectly rounded shape; 'Spindrift,' palest pink; 'Inspiration,' rose-mahogany; 'Three Oaks,' red from Mrs. Blake's Estate; 'Edward Rapham,' red; 'Red Douglas,' red; 'Action Front,' copper and brown; 'Loomis,' flamingo-pink with tangerine beard; 'Morrow,' rose; 'Sable,' black-purple; 'Ola Kala,' yellow; 'Vision Fugitive,' white tinged yellow (lovely); 'Rameses,' yellow and pink; 'Nedlefevre,' pink, brown and black; 'Thelma Jean,' red-purple and 'Sentinel,' orange in varied tones.

Some of these were very interesting, but all had suffered from the weather.

The Arnold Arboretum was beginning to look its best with its hundreds of acres of wooded hills and valleys. Here and there were placed drifts of Azaleas and masses of Lilac in all colours, and oh, the beauty of the Dogwood! It is impossible to do justice to it through pen and ink. Not only the colour, from paler pink to that of a brilliant Azalea, but the manner of growth was so entrancing, branching out in a kind of flat way, not in the least crowded, but as though some Japanese decorative artist had arranged them to show to their best advantage. The white Dogwood was lovely, too, but could not compete with the beauty of its colourful neighbour. One wonders why this is not grown in England. The mingy little shrubs that I have occasionally seen give no idea of its real splendour, and when a branch is placed in water it lasts a fortnight.

Motoring through some of the large estates on the North Shore, I was struck with the fine planting and grouping of trees and shrubs, but it was sad to see many great houses being pulled down in order that the estates should be cut up and smaller houses built, for gardeners are most difficult to obtain, as indeed is all labour. Some of the little gardens are very attractive and become "living rooms" in the hot climate (usually met with) around Boston.

One of the most interesting things to me was the prevalence of evergreen plants growing in pots in the houses. The most popular being the Philodendron usually listed here as a stove plant, but grown in the States as freely as the Aspidistra used to be here. I saw three or four varieties, one with very large leaves, others with medium and small leaves, also one with long spear-like leaves; green and very glossy; they

make handsome specimens and also trail. There are about eighty varieties known. Ivy was much used indoors, and one also saw the Kangaroo Vine, *Vitis australis*, an evergreen with the foliage of a grape vine, and which does well with me as a window plant.

Driving through the "cutting" garden of a beautiful estate, Penguin Hall, where all the flowers for the house were grown, I noticed Carnations grown out of doors in, to me, an unusual way—large round bushes they were, some 2 feet across and about 1½ or 2 feet high. Here also were hedges of Paeonies and Delphiniums.

It was unusual, too, to see in a wild or "woodsy" garden as it is called, a drift of pink and white Moccasin flowers, that exquisite Lady's Slipper Orchid. Driving along a road bordered with high rocks, one saw what appeared to be a Persian carpet hanging over them, but it was just a mass of such plants as Aubrietia and Phlox to delight the passer by. All the towns, large and small, were planted with trees and had wide borders of green turf, most restful to the traveller.

LADY MARTINEAU.

Kolkwitzia amabilis

I was interested to read in the JOURNAL of the Royal Horticultural Society, June 1948, an article on *Kolkwitzia amabilis* in Pennsylvania by ELIZABETH HESS. I have grown this shrub in my garden at Neston, Cheshire, but the results have not been very striking.

I obtained it about fourteen years ago; it was planted in full sun on a well-drained bank in light loam. It grew for about ten years before it produced one small cluster of flowers; the following year it did not flower, then came the severe winter of 1946-47 after which it produced a few small clusters of flowers on two of its branches, and now (June 5), after the hot dry summer of 1947, it is flowering fairly well and quite a beautiful sight. It flowers here from about the middle of May until mid-June.

It is perfectly hardy and I have never seen it damaged by a spring frost, but it would seem that it requires those conditions of extreme winter cold and hot dry summer that it so rarely experiences here in order to flower freely.

M. C. PRATT.

In ordinary medium heavy loam, in an exposed position in this exposed garden in East Anglia the shrub grows like a weed and is quite unaffected by the hardest frosts. It is really beautiful sight covered with bloom as it is every year—hail, blow, snows or drought. It throws up strong suckers which, coming up with great masses of fibrous roots, quickly establish themselves to form fresh bushes.

SIR RALPH GRIFFITH,
Bury St. Edmunds.

A NOTEWORTHY LADY'S MANTLE, *ALCHEMILLA MOLLIS*

William T. Stearn

WERE there no *Alchemillas*, our gardens would be little the poorer. Nevertheless a number are to be found in botanic gardens and twelve kinds, popularly known as Lady's Mantles,* grow wild in our meadows and hill-pastures. While their foliage is low, neat and sometimes attractively silvered, their small greenish flowers usually do little or nothing to catch the eye. An exception is a comparatively robust July-flowering plant (Fig. 106), more common in gardens than the others, which suggests when in flower a small greenish yellow (uranium green) *Gypsophila paniculata*. Its loose sprays of starry blooms stand between one and two feet high; cut for indoor decoration, they look charming in a vase of green glass. This species is *Alchemilla mollis*, so named because its rounded basal leaves are delightfully furry and soft to the touch; after a shower or a damp night they glisten with a thousand drops of rain or dew. No horticultural reference book describes the plant, because the genus *Alchemilla* as a whole has little garden value, its species are notoriously numerous and difficult to distinguish, their literature is vast and perplexing, and the name and provenance of this Lady's Mantle have hitherto been doubtful. It may be encountered in gardens as *A. acutiloba*, *A. grandiflora*, *A. major*, or even *A. vulgaris*, but usually it has no name at all.

Ascertaining the scientific name of an *Alchemilla* is not easy. Few as members of the genus are in gardens, they exist in the wild as scores of minutely differentiated forms. Many of these have defective pollen and owe their preservation and surprising constancy of character to seed parthenogenetically produced. By means of apomixis, forms which differ in only a few apparently trivial features may nevertheless hold these constant and spread into populations of considerable range. Such forms have great botanical interest and, during the last hundred and ninety odd years, approaching five hundred specific names have been bestowed upon them. To find a way through the jungle of scattered descriptions and subtle distinctions, which has grown up in botanical literature about *Alchemilla*, needs a specialist's patience and knowledge. The bewildered gardener can hardly make a start. I have to thank MR. A. J. WILMOTT of the British Museum (Natural History), for indicating the affinity of this cultivated plant with *A. acutiloba* Steven, non Opiz, and the German *Alchemilla*-specialist HERR WERNER ROTHMALER for confirming its identity with *A. mollis* (Buser) Rothmaler.

A. mollis belongs to a group of about twenty-five microspecies, native to south-eastern Europe and western Asia, and characterized

* The name of 'Our Ladies Mantel' dates from *The Names of Herbes* (1548) by William Turner (c. 1510-1568) who classed the plant among 'ncwe founde Herbes, whereof is no mention in any olde auncient wryter,' but it is probable that Turner merely rendered into English the German name 'unser Frawenmantel' (Brunfels, 1532) otherwise 'unser frouwen mantel' (Brunschwygk, 1500); this and the Gaelic 'Falling Mhuire' (Mary's cloak) refer to the leaf-form of the *Alchemilla vulgaris* group.

by tall growth, large almost orbicular basal leaves, loose inflorescence and yellowish flowers somewhat bigger than those of other Lady's Mantles; the receptacle is somewhat conical and slightly shorter than the four pointed sepals and the four equally long but slightly narrower epicalyx segments alternating with them. It was described in 1893 by ROBERT BUSER (1857-1931) as "*A. acutiloba*" and named by him *A. acutiloba* b. *mollis* in 1896. His descriptions and specimens leave no doubt as to the character of the plant he had before him. In 1934 ROTHMALER gave it specific rank as *A. mollis* (Buser).*

A. mollis was introduced into cultivation in 1874 by the Tirolean plant collector THOMAS PICHLER of Lienz, who gathered it on the Bithynian or Mysian Olympus (Keshish Dagħ or Ulu-dagħ) south of Brusa (Bursa) in north-west Asia Minor, where EDMOND BOISSIER discovered it as long ago as 1842: it grows here at about 5,300 ft. Its range is evidently wide, since it is recorded from elsewhere in Asia Minor as well as from the east Transylvanian Carpathians (near Sinaia and Predeal and on Mount Csukas). In the garden it is by no means particular about position or soil, and has even thriven between the chinks of a paved path. Directly flowering begins to wane, the inflorescences should be cut off, as they seed all too profusely. The seedlings display no variation.

The nearest ally of *A. mollis* in gardens is *A. speciosa* Buser, a native of the Caucasus. In botanic gardens *A. speciosa* is as widespread as *A. mollis*, from which it differs principally in having hairy pedicels and more deeply divided leaves, the lobes extending inwards for a quarter to a third of the radius. Grown in good well-watered soil, both it and *A. mollis* make pretty mounds of greenish yellow starry flowers and may well be cut for indoor decoration, despite the ease with which the

*Its main synonymy and characters are as follows :—

Alchemilla mollis (Buser) Rothmaler in Fedde, Repert. Sp. Nov. 33. 347 (1934), Fedde, Repert. Beih. 100. 76 (1938).—" *A. acutiloba*" Buser in Magnier, Scrinia Fl. Selectae, 12. 280 (1893); Javorka & Csapody, Magyar Fl. Kep. 254, fig. 1854 (1931); non Steven.—*A. acutiloba* var. *mollis* Buser in Bull. Herb. Boissier, 4. 759 (1896); Hayek, Prod. Fl. Balcan. 1. 692 (1927).—*A. grandifolia* hort. Bowles, My Garden in Summer, 153 (1914), nomen subnudum.

Herb perennial, comparatively robust, forming thick tufts of basal leaves; *rhizome* stout, 5-10 mm. thick; *leaf-stalk* hairy throughout, up to 30 cm. long; *leaf-blade* more or less circular in general outline, indented shallowly into eleven curved lobes, the depth of the marginal indentation being almost one-sixth to a quarter of the radius of the leaf from the top of the lobe to the insertion of the stalk, each lobe having twelve to eighteen triangular-ovate teeth and the whole blade being 8-15 cm. across, velvety to the touch, especially below, with a close silky coating of short fine erect hairs; *stem-leaves* usually four below the inflorescence, fairly large, but smaller and shorter-stalked than the basal leaves; *stipules* conspicuous; *flowering stem* erect, about 50 cm. high, conspicuously hairy with fine erect hairs up to the branches of the inflorescence; *inflorescence* loose, much-branched and many-flowered, somewhat like an inverted cone in general shape, 15-20 cm. long, 5-15 cm. across, the branches slender, erect, hairy in the lower part, hairless in the upper; *pedicels* hairless, 1-3 mm. long; *flowers* 2.5-4 mm. across, greenish-yellow; *calyx-cup* conical, with a few scattered hairs, small and shorter than the pointed, about 1.5 mm. long *epicalyx-segments* (*episepals*) and *sepals*.

Type locality: Bithynian Olympus.

blooms fall. Although, as JASON HILL observes, green or greenish flowers usually fail to wake much enthusiasm, "because greenness in flowers is often part of a policy of self-effacement which is entirely out of place in a garden plant," the quiet grace and other good qualities of these Lady's Mantles should find them a home in those gardens where plants of unusual character are welcome.

PLANTS TO WHICH AWARDS HAVE BEEN MADE IN 1948

Brassocattleya 'Roger Sander' A.M. March 16, 1948. An attractive hybrid. Flower of large size, bright mauve-purple, the expansive labellum orange-yellow. Obtained by crossing *C. 'Omar'* with *Bc. Vilmoriniana*. Raised and exhibited by Messrs. Sanders, St. Albans. (See p. lvi.)

Cattleya Trianae var. 'A. C. Burrage.' A.M. March 2, 1948. An unusually fine form of this well-known species. The broadly formed sepals and petals are blush-rose and the expansive labellum has a purple front lobe. Exhibited by H. W. B. Schroder, Esq., Dell Park, Englefield Green. (See p. liv.)

Cymbidium 'Adele Sander' var. 'Gold' A.M. March 16, 1948. The spike bore three flowers of bright greenish-gold colour, the labellum spotted with crimson. Raised and exhibited by Messrs. Sanders, St. Albans, the parents being *C. 'St. Alban'* and *C. Alexanderi*. (See p. lvi.)

Cymbidium 'Aton,' Westonbirt var. A.M. March 16, 1948. The tall spikes bore 16 large flowers, cream-coloured, the labellum much marked with crimson-red. The result of crossing *C. 'Baldur'* with *C. 'Pearl,'* Raised and exhibited by Messrs. H. G. Alexander, Tetbury, Glos. (See p. lvi.)

Cymbidium 'Bullfinch,' Exbury var. A.M. March 2, 1948. The tall spike bore fourteen large flowers, somewhat cup-shaped, with white sepals and petals, the labellum profusely spotted with crimson. Raised and exhibited by Major Edmund de Rothschild, Exbury, Southampton. (See p. liv.)

Cymbidium 'Flare' A.M. March 16, 1948. The spike carried a dozen flowers, the sepals and petals brownish crimson, the labellum cream-coloured with the front lobe deep crimson. The result of crossing *C. 'Edzell'* with *C. 'Rio-Rita.'* Raised and exhibited by H. W. B. Schroder, Esq., Dell Park, Englefield Green. (See p. lvi.)

Cymbidium 'Irish Melody' A.M. March 16, 1948. The spike carried seven large flowers of bright greenish yellow colour. Parentage unrecorded. Exhibited by Ambrose Congreve, Esq., Winkfield Manor, Ascot. (See p. lvi.)

Cymbidium 'Ispahan,' Exbury var. A.M. February 17, 1948. The spike bore six large flowers, creamy-white, the labellum pink with

crimson markings. Exhibited by Major Edmund de Rothschild, Exbury, Southampton. Produced by crossing *C. Lowio-grandiflorum* with *C. 'Rosanna.'* (See p. li.)

Cymbidium 'Memoria S. G. Alexander' F.C.C. February 17, 1948. An excellent result produced by crossing *C. 'Rosanna'* with *C. 'Pharos.'* The spike bore seven large well-formed flowers, bright greenish-yellow, the front lobe of the labellum bordered with crimson. Raised and exhibited by Messrs. H. G. Alexander, Tetbury, Glos. (See p. li.)

Cymbidium 'Radax' A.M. February 17, 1948. The spike bore seven flowers of greenish-gold colour, the labellum profusely spotted with crimson. Raised and exhibited by McBean's Orchids, Ltd., Cooksbridge, Sussex. The parents were *C. 'Claudette'* and *C. 'Pearl'*. (See p. li.)

Cymbidium 'Remus' F.C.C. February 17, 1948. This fine hybrid between *C. 'Regulus'* and *C. 'Joyful'* carried a spike of ten large flowers, in colour reddish crimson, which is more intense on the labellum. Raised and exhibited by H. W. B. Schroder, Esq., Dell Park, Englefield Green. (See p. li.)

Cymbidium 'Ruskin' A.M. February 17, 1948. This charming hybrid between *C. 'Ceres'* and *C. 'Pearl'* bore a spike of ten flowers, in colour carmine-rose, the expansive labellum bordered with red-brown. Exhibited by G. P. Harben, Esq., Calmore, Southampton. (See p. li.)

Cymbidium 'Ulysses.' A.M. March 2, 1948. The spike bore a dozen flowers, in colour golden-bronze, the labellum marked with crimson. The result of crossing *C. Pauwelsii* with *C. 'Hathor.'* Raised and exhibited by Messrs. H. G. Alexander, Tetbury, Glos. (See p. liv.)

Cymbidium 'Vulcan' A.M. February 17, 1948. The spike bore seven flowers of brownish-red colour, the labellum whitish with an intense crimson blotch at the apex. The result of crossing *C. 'Pocahontas'* with *C. 'President Wilson.'* Raised and exhibited by Messrs. H. G. Alexander, Tetbury, Glos. (See p. li.)

Cypripedium 'Golden Moon' A.M. January 13, 1948. A flower of particular beauty. The broadly developed dorsal sepal is rich honey-yellow, with a few vertical lines of brown in the centre, while the petals are yellowish brown and glossy. The ventral sepal is unusually developed. The result of crossing *C. 'Hancar'* with *C. 'Gold Mohur.'* Raised and exhibited by Messrs. H. G. Alexander, Tetbury, Glos. (See p. xlviii.)

Cypripedium 'Greenstede' A.M. February 17, 1948. A large and roundly-formed flower. In colour mainly apple-green with slight brown spotting. Exhibited by Mr. S. Farnes, East Grinstead. The result of crossing *C. 'Golden Moon'* with *C. 'Dickler.'* (See p. li.)

Cypripedium 'Snow Bunting' var. 'Muriel' A.M. January 13, 1948. An attractive flower of model formation. Pure white except for some minute spotting on the dorsal sepal. Raised by Lord Aberconway and exhibited by Messrs. H. G. Alexander, Tetbury, Glos. (See p. xlviii.)

Hippeastrum 'African Glow' A.M. March 16, 1948. A very handsome scarlet (H.C.C. 19) variety with four flowers measuring $7\frac{1}{2}$ inches across and borne on a stout scape 2 feet high. The segments have a deeper zone in the middle with two pale streaks terminating in a green base. Raised and sent to Wisley by A. C. Buller, Esq., Dwars-rivershoek, Dist., Stellenbosch, Cape Province, South Africa, and exhibited on his behalf by the Director, R.H.S. Gardens, Wisley, as *Hippeastrum* W1/D8LF. (See p. lv.)

Hippeastrum 'Darkest Africa' A.M. March 16, 1948. A lovely vermilion (H.C.C. 18) variety with four flowers measuring 7 inches across and borne on a stout scape 2 feet high. The segments are streaked with white and are pale green at the base. Raised and sent to Wisley by A. C. Buller, Esq., Dwars-rivershoek, Dist., Stellenbosch, Cape Province, South Africa, and exhibited on his behalf by the Director, R.H.S. Gardens, Wisley, as *Hippeastrum* W3/DA. (See p. lv.)

Hippeastrum 'Table Mountain' A.M. March 16, 1948. The four magnificent well shaped flowers of this variety are of a very decided colour (Vermilion (H.C.C. 18/1)) and measure $8\frac{1}{4}$ inches across. They are borne on stout scapes 2 feet high. The colour deepens in the middle of the segments which are slightly touched with green. Raised and sent to Wisley by A. C. Buller, Esq., Dwars-rivershoek, Dist., Stellenbosch, Cape Province, South Africa, and exhibited on his behalf by the Director, R.H.S. Gardens, Wisley, as *Hippeastrum* W9/523 KB 10 E. (See p. lv.)

Laeliocattleya 'Erato.' F.C.C. March 2, 1948. This elegant hybrid bore a couple of large and well-formed flowers. The sepals and petals are white, and the labellum rich crimson-purple. Raised and exhibited by H. W. B. Schroder, Esq., Dell Park, Englefield Green, the parents being *Lc. 'Aconcagua'* and *Lc. Schroederae*. (See p. liv.)

Lycaste 'Barbara Sander' A.M. January 13, 1948. The plant carried three well-formed flowers of rich crimson-rose colour. Raised and exhibited by Messrs. Sanders, St. Albans, the parents being *Lycaste Skinneri* var. 'Mrs. Hamilton Smith' and *Lycaste Balliae*. (See p. xlviii.)

Magnolia stellata var. rubra A.M. March 16, 1948. A distinct seedling variety of the well-known white-flowered species, raised by Messrs. Kluis of Boskoop. In the specimen exhibited the flower had about fourteen narrow, strap-shaped petals over 2 inches long, flushed outside with Fuchsia-purple (H.C.C. 28/3), and rather paler within. Exhibited by Messrs. R. C. Notcutt, Ltd., Woodbridge, Suffolk. (See p. lvi.)

Mahonia pinnata A.M. March 16, 1948. A hardy, evergreen, Californian shrub closely related to the better-known *M. Aquifolium*, but differing in its taller growth up to 10 or 12 feet, shorter petioles and more numerous, sinuately spiny-toothed leaflets. The flowers are pale yellow, in fascicled racemes up to 3 inches long, the berries purplish-black, globose-ovoid in shape. Exhibited by Dr. M. Amsler, Delmonden Manor, Hawkhurst. (See p. lvi.)

Miltonioda 'Carol' A.M. January 13, 1948. The erect spike bore

six flowers of medium size and purplish mauve in colour. The result of crossing *Miltonioda* 'Lilian' with *Miltonia pulchra*. Exhibited by Messrs. Charlesworth & Co., Haywards Heath, Sussex. (See p. xlviii.)

***Miltonioda* 'Esa' var. 'Carol'** This is the correct name of the hybrid between *Miltonioda* 'Lilian' and *Miltonia pulchra* which Obtained an Award of Merit on January 13, 1948. (See p. xlviii.)

***Muscari moschatum flavum* A.M.** March 16, 1948. A hardy bulbous plant collected by Mr. Peter Davis on Amorgos Island. The erect scape bears a terminal spike of about thirty tubular-campanulate yellow flowers with a dark purplish-black rim at the half-closed mouth of the perianth. The flower is strongly and pleasantly scented. The leaf is about 10 inches long, linear-lanceolate, channelled, and glaucous on the upper surface. Exhibited by E. B. Anderson, Esq., Russettings, Rickmansworth. (See p. lvi.)

***Odontonia* 'Carlanie' var. 'Babylon' A.M.** February 17, 1948. The spike bore six large flowers in which the segments are heavily blotched with purplish crimson. The result of crossing *Odontonia* 'Carina' with *Odontoglossum* 'Melanie.' Raised by Messrs. Charlesworth & Co., and exhibited by Messrs. Sanders. (See p. li.)

***Odontonia* 'Mandania' var. 'Cathay' A.M.** March 2, 1948. An elegant hybrid obtained by crossing *Oda*. 'Mandela' with *Odm*. 'Ascania.' The spike bore nine flowers of deep-yellow colour with bold chocolate-red blotching. Raised and exhibited by Messrs. Charlesworth & Co., Haywards Heath. (See p. liv.)

***Odontioda* 'Pola' A.M.** February 17, 1948. A pleasing hybrid obtained by crossing *Oda*. 'Brenda' with *Oda*. 'Marie Antoinette.' The spike bore five roundly-formed flowers, in which the segments are rose-coloured with much scarlet-red blotching. Exhibited by Messrs. Charlesworth & Co., Haywards Heath. (See p. li.)

***Salix apoda* (male form) A.M.** March 23, 1948. A prostrate Willow from the Caucasus; the specimen exhibited being grown from material collected by the exhibitor. The catkins are at first covered with light-grey down, through which the orange-tipped stamens appear as they elongate; when the anthers dehisce their colour changes to pale yellow and the general effect when in full flower is of a small yellow bottle brush $1\frac{3}{4}$ inch long and $\frac{3}{4}$ inch wide. Exhibited by Messrs. W. E. Th. Ingwersen, Birch Farm Nurseries, Gravetye, East Grinstead, Sussex. (See p. lxi.)

× ***Saxifraga Biasolettii* var. "Crystallie" (*S. Grisebachii* × *S. thessalica*) A.M.** March 16, 1948. A fine hybrid with grey-green rosettes, composed of narrow spatulate leaves, $1\frac{1}{2}$ inch long, white-encrusted along the margins and at the tips. Flower stems well coloured, approaching Rhodamine purple (H.C.C. 29); cauline leaves, coloured except at the tips which are grey-green and encrusted. The leaves are narrower than in *S. Grisebachii*, the flower stems slightly thinner, and the colour rather more purple. The general coloration is deeper than in *S. Biasolettii*. Exhibited by G. P. Baker, Esq., V.M.H., Hillside, Oakhill Road, Kippington, Sevenoaks. (See p. lvii.)

***Sophrolaeliocattleya* 'Cicely Watson' A.M.** January 13, 1948. The spike bore two flowers of medium size, but well formed, and of

purple colour tinged with crimson. Produced by crossing *Lc.* 'St. Gothard' with *Slc.* 'Vulcan.' Raised and exhibited by Messrs. Black & Flory, Slough. (See p. xlviii.)

Wilsonara 'Lyoth' var. 'Ruby' A.M. April 6, 1948. A showy hybrid between *Odontioda* 'Venusta' and *Oncidium Claesianum*. The branches spike carried 37 flowers of scarlet-red colour. Raised and exhibited by Messrs. Charlesworth & Co., Haywards Heath. (See p. lvi.)

BOOK NOTES

"Insect Pests of Glasshouse Crops." By H. W. & M. Miles. 200 pp., 24 plates with 12 text figs. (Crosby Lockwood & Son Ltd., 1948.) 15s. net.

A welcome addition to the literature of horticultural pests and their control is the appearance of the second edition of this text-book. Some thirteen years have elapsed since the publication of the first edition (*R.H.S. Jour.*, 1936, 61. 186-187), and this amended and modernized edition will be welcomed by horticulturists and plant pathologists, who are aware of the great strides that have been made in recent years on the avoidance and control of injurious plant organisms. In view of the prolonged economic crisis, there exists a considerable delay in the republishing of standard works which is greatly to the disservice of crop husbandry. Most text-books become out-of-print before a review appears though this is of minor importance in the present case.

The authors, Prof. and Mrs. Miles, are well known for the active parts they play in the fields of horticultural and entomological research and teaching. Little requires to be added to former reviews other than to record certain amendments, which were inevitable owing to the marked advances in pest control measures that have been made since 1935. Some modification has been made in the presentation of the subject matter, which will be generally acclaimed. The photographic illustrations are excellent, and show the high standard that is expected of this firm of publishers.

This book remains in the first rank of entomological text-books, and will long continue to be the authoritative treatise on glasshouse pests.

G. FOX WILSON

"The English Landscape Garden." By H. F. Clark. 64 pp. Illus. (Pleiades Books, 1948.) 12s. 6d.

The bi-centenary of the death of William Kent has roused interest again in the development of landscape gardening in England in the eighteenth century in which he played so important a part. One could wish that Mr. Clark's compact book were longer, but it gives a well-informed and well-balanced account of the confused course of that development. In the first part of his book he deals with the mass of literature which arose during the century in which landscape design was treated wholly as a branch of aesthetics. But possibly Mr. Clark credits the writers with too much direct influence on the practical designers.

In the case of Brown, theory probably played no part at all. As a successful practitioner he was willing to talk theory on occasion but probably only because he felt it was expected of him and apparently he did not do it at all well. The born gardener, like the born artist, the born cook, might one venture to say, the born business chief?—does not make the indirect approach of theory, so often misleading, but gets the feel of his material and proceeds straight from that. With unerring practical imagination Brown hit upon a formula which emphasized sympathetically the normal characteristics of English scenery—its gentle irregularities, the beauties of its grass and trees, its mildness and its peace. In that only half-tamed nature the beast and bird of the countryside still felt at home, and for a sense of movement Brown relied not on the leap of fountains and rush of cascades but on still stretches of water which should reflect England's variable light and changing skies. The English landowner, duke or squire, responded eagerly to a conception so much in harmony with his retired outlook and his daily life and Brown was kept busy till the end of his life with the transformation of estates. Blenheim and Brockett are enough to explain his success, but he had neither time nor need to vary his formula, it became too rigid and himself too complacent. There is no doubt that he destroyed far too much.

Mr. Clark traces the continuation of Brown's work by Repton, who varied and enlarged the "formula," restored the cultivation of flowers and left detailed records of his aims and methods in the famous "Red Books" and also in his published works. The

principles of landscape lay-out remained fundamentally the same throughout the nineteenth century.

In the latter part of his book Mr. Clark gives account of six famous eighteenth-century gardens, most interestingly illustrated from early prints or exceptionally well-chosen photographs; also a list of books on which he has drawn and in which the reader may profitably follow up the subject.

F. CARDEW

"Hormones and Horticulture." By G. S. Avery, E. B. Johnson, R. M. Addoms, and B. F. Thomson. 326 pp., numerous illustrations. (McGraw-Hill Co. 1947.) 27s.

The senior author may be known to readers of the JOURNAL as Director of the Brooklyn Botanic Gardens, and as translator and author of the English edition of *Die Wuchstoffsstheorie*, by Professor Boysen Jensen of Copenhagen; whereas the earlier work, 1936, was concerned with the discovery of plant hormones, the present volume, as its sub-title indicates, deals with the use of special chemicals in the control of cultivated plants, by regulating their growth.

In the boldly written preface it is stated that "A chemical revolution is sweeping through the agricultural world" and that "with the current efforts to regulate growth by the application of minute amounts of growth-controlling hormones we enter an important new era." The authors explain that they have used the term hormone in a wide sense, this permits the inclusion of a chapter on the use of chemical sprays to thin out the blossoms of fruit trees, so tending to overcome the problems arising from the alternate years of heavy and light crops of apples. The substances so used, the salts of di-nitro-cresylic acid, and the closely related di-nitro-cyclo-hexyl-phenols are not usually regarded as "hormones" or growth regulators; nor are the chemicals concerned with the termination of resting periods of plant tissues or with the doubling of the chromosomes, but the text gains by taking this broader view of the application of chemistry to horticulture.

A comprehensive review of the results obtained in plant propagation, from the use of hormones in facilitating the rooting of cuttings, based on data collected from many sources, and condensed forms a valuable feature of the book; but the lengthy table of results, some seventy pages, cannot claim to be complete, for no mention is found of the many tests made in Antwerp, and other omissions occur including lists of plants so tested and reported in this JOURNAL.

The chemical control of the pre-harvest fall of apples and other fruits is brought under brief review; the initiation of fruit formation without fertilization and seed production is similarly dealt with; tabular data aid condensation of the results obtained, and a brief summary and evaluation is provided in each case. The review of the work carried out with seeds is rather more critical, for the results so far obtained have not on the whole given indications of practical value.

The use of these substances as selective weed killers is now well known but their agricultural value exceeds their horticultural usefulness, for the plants of the kitchen garden and the decorative shrubs of the borders may readily be damaged by these chemicals. This is made quite clear in the text and by means of illustrations, of which there are many scattered throughout the chapters.

Other chemicals and their use that are considered include ethylene chlorohydrin which may stimulate dormant resting buds to grow promptly, and the use of naphthalene acetic acid to inhibit bud development. The concluding chapter deals with the use of colchicine and other substances for the production of new varieties of cultivated plants. Without undue technicality, an attempt is successfully made to show how polyploidy may be brought about, how polyploids can be recognized, and how some such plants may be of garden value, for their increased size and vigour will often be appreciated. The reader is warned that the proportion of such useful plants, so obtained, may be small; but the authors state that "an occasional new form may more than justify much apparently fruitless work."

Throughout, the text gains in authority by the enlisted co-operation of prominent American specialists in each branch of the subject considered. The large number of references to the literature provided at the end of every chapter will assist those requiring further detailed information, and will indicate to the general reader the many investigations that have been carried out before these applications of plant physiology and chemistry can be usefully applied to horticulture. Although primarily concerned with American conditions and American varieties of fruits, as English varieties are mentioned, and as there are many common factors in our horticulture, this book is recommended to the Fellows as a very useful summary of the present position in a subject of much topical interest and one likely to have many future developments.

M. A. H. TINCKER

"Asparagus." By A. W. Kidner. 168 pp. (Faber and Faber, 1947.) 15s.

The author of this book is a successful Asparagus grower and raiser of so-called pedigree crowns. After an introduction, 28 pages are devoted to the history, distribution and cultivation of Asparagus in different countries (and asparagus when used as a generic name should be *Asparagus*). Subsequent chapters that describe the author's methods of growing and marketing Asparagus are refreshingly free from dogmatic statements, whilst the sections which deal with the genesis and productivity of the so-called pedigree crowns constitute a valuable factual record. In fact, whenever the book deals with Asparagus the statements made merit serious consideration (although the criticism of the Wisley work on the relative productivity of male and female crowns appears to be based on an unjustified assumption). When the author ventures outside this field the results are less happy. A most peculiar description of osmosis does not, it is true, differ materially from that found in out-of-date botanical texts. When, however, we find that "all bacteria must have 'light' (how does 'light' differ from light?) which they use as power to move digestive juices" or that "Nature has designed a different form of heredity for all living species," the reviewer is, to say the least, surprised. It is a pity that the book has so many blemishes of this kind, but perhaps to those who are interested in Asparagus only, they do not matter. Excellent photographs illustrate the book, the contents of which should give all Asparagus growers much food for thought, and on that account it may be welcomed. The index has 64 entries only and is quite inadequate.

L. G. G. WARNE

"Crop Production and Environment." By R. O. Whyte. 8vo. 335 pp. with 32 plates. 53 Figs. Faber, London, 1947. Price 25/-.

The author undertook an intriguing but difficult task when he decided to attempt to bring together two different worlds, that of the experimental plant biologist and that of the cultivator of crops in farm, garden, glasshouse or forest. He pictured a shadow conference at which scientists mingled with the practical growers. His book reports chiefly the scientific discussions, the practical men, presumably, did not make lengthy or numerous contributions at his conference.

The conspicuous value of this book lies in the bringing together of so much recently acquired physiological information, gathered from world wide sources; there are adequate quotations, many citations, full references to the literature and most useful indexes to help the reader to obtain further facts. Few authors enjoy the ample facilities afforded by the Imperial Agricultural Bureaux for access to and translation of so many publications, including those of Russian and Scandinavian origin.

The chapters form well written reviews of the progress made in the study of growth and development of plants in relation to factors of their environment including temperature, light intensity, the duration of the light, and in regard to the treatment of seeds before sowing. The range of crops dealt with is wide and includes many of horticultural interest, both decorative and useful. The author points out how the studies under review explain garden and field observations, and how practical procedure, arrived at by experience, has been determined by underlying principles. He has generally refrained from pungent criticism of the recent theories that have been put forward, the practical grower might have valued highly such judgments. A time-lag occurs between scientific discovery and its horticultural or agricultural application—it permits critical appreciation; perhaps sufficient time has as yet not elapsed for the commercial utilization of a great deal of the information in these pages. Thus this book is recommended to those whose business it is to curtail this period, to those who would like to learn of recent progress, and to the serious horticultural student.

M. A. H. TINCKER

"Colchicine Bibliography." By O. J. Eigsti. Supplement by P. Dustin, Jr. Reprinted from *Lloydia*, Vol. 10, pp. 65-114 June 1947. Lloyd Library Cincinnati, Ohio. 50c.

It is just ten years since Colchicine was first used as an effective agent in inducing chromosome doubling in plants, and the list of publications on the subject, as shown by Dr. Eigsti's valuable Colchicine Bibliography, now exceeds eleven hundred; to this must be added the supplement by P. Dustin, Junior, of over two hundred papers.

When a new discovery is made there is always a time-lapse before the full and true story of it is known to the world. The discovery of Colchicine is no exception. There are short historical introductions to the two sections of the bibliography, but one is still left in doubt, after reading them, as to who first discovered the action of Colchicine on plant chromosomes.

E. K. JANAKI AMMAL

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JOURNAL OF THE ROYAL HORTICULTURAL SOCIETY

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Part 10

October 1948

THE SECRETARY'S PAGE

Subscriptions—Fellows and Associates are asked to inform friends desirous of joining the Society that, if a Fellow or Associate is elected during the last three months of the year, only a year's subscription is required to obtain all the privileges during the remainder of 1948 and the whole of 1949.

Programme of Meetings—The following Meetings with Shows will be held during October and November:—

- { Tuesday, October 5—12.30 to 6 P.M.
- { Wednesday, October 6—10 A.M. to 5 P.M.
- { Tuesday, October 19—12 noon to 6 P.M.
- { Wednesday, October 20—10 A.M. to 5 P.M.
- { Tuesday, November 2—12 noon to 6 P.M.
- { Wednesday, November 3—10 A.M. to 5 P.M.
- { Tuesday, November 30—12 noon to 6 P.M.
- { Wednesday, December 1—10 A.M. to 5 P.M.

Competitions—The Annual Autumn Fruit and Vegetable Show will be held in conjunction with the Fortnightly Show on October 5 and 6, and on the same dates there will be a Flower Arrangement Competition for Professionals. At the Show on October 19 and 20 there will be a Tree and Shrub Competition, and at the Show on November 30 and December 1 the Late Apple and Pear Competition will be held. A schedule of the Fruit and Vegetable Show and particulars of the competitions may be obtained from the Secretary.

Lectures—The following lectures will be given in conjunction with the Shows in October and November:—

On October 5—"Old Varieties of Apples" by MR. P. MORTON SHAND.

On October 19—"Nutrition Problems connected with Horticultural

plants, with a special reference to trace elements," Masters Memorial Lecture, Part II, given by PROF. T. WALLACE, C.B.E., M.C., D.Sc., A.I.C.

On November 2—"Plant Hunting in South-Eastern Tibet" by DR. GEORGE TAYLOR.

On November 30—"Recent Developments at Wisley" by MR. J. S. L. GILMOUR, M.A., and MR. F. E. W. HANGER.

Demonstrations at Wisley—During October and November the following demonstrations will be given at the Society's Gardens at Wisley, in each case the demonstration on the second day being a repetition of that on the first:—

October 6, 7, Digging, Trenching, Manuring and Composting (2 to 4 P.M.).

November 3, 4, Planting of Fruit Trees and Roses (2 to 4 P.M.).

December 1, 2, Pruning of Fruit Trees (2 to 4 P.M.).

Kindred Societies' Shows—The Cactus and Succulent Society of Great Britain will hold its Show in the New Hall on October 5 and 6, in conjunction with our Show. The British Carnation Society will hold its Show in the Old Hall in conjunction with our Fortnightly Show on November 2 and 3. On Thursday, November 4 and Friday, November 5 the National Chrysanthemum Society will hold a Show in the New Hall. The Royal Horticultural Society's tickets will not admit, but admission may be obtained on payment at the door.

Distribution of Seeds from Wisley—Last year the response from Fellows to the appeal for surplus seeds for distribution from Wisley was excellent. It is hoped that once again any Fellows who have surplus seeds from their gardens, especially of good or unusual plants, will be kind enough to collect and send them, carefully labelled with the name of the plant, to the Director, R.H.S. Gardens, Wisley, Ripley, Woking, Surrey.

Technical Advice—A large number of specimens, both of flowers and fruit, are still being received at the Society's Offices for technical advice or for naming. In nearly every case these specimens have to be sent to our Gardens at Wisley and, owing to postal delays, this involves at least another twenty-four or even forty-eight hours' delay before they reach the experts at Wisley. In consequence, specimens become very faded and often useless for the purposes for which they have been submitted. Will all Fellows in future please send such specimens and enquiries of a technical nature to the Director, R.H.S. Gardens, Wisley, Ripley, Woking, Surrey, quoting at the same time the number which is shown on their Fellowship tickets.

Wisley Gardens—Attention is drawn to the fact that on Sundays during October the Wisley Gardens will be open between the hours of 2 P.M. and 5 P.M. and only to those presenting Fellows' or Associates' tickets. The Gardens will be closed on Sundays from November 7 to March 6 inclusive.

The British Pteridological Society—We have been informed by the Honorary Secretary of The British Pteridological Society, MR. J. R. PULHAM, HON. A.I.L.A., 71 Newman Street, London, W. 1,

that this Society has now been revived after having been inactive throughout the War. The first Annual Meeting was held on August 10; a new Committee has been appointed and the Society hopes to resume full activities at an early date. Enquiries should be addressed to the Hon. Secretary.

National Federation of Women's Institutes' Exhibition and Demonstration—The National Federation of Women's Institutes will hold a Handicraft Exhibition and Demonstration in the New Hall from Saturday, October 9, till Tuesday, October 12, except Sunday October 10, to which Fellows' and Associates' tickets will admit.

British Standards Institution—We have been asked to announce that following a Conference to consider requests from the Ministry of Agriculture and the National Farmers' Union, a Committee has recently been formed by the British Standards Institution under the Chairmanship of MR. P. J. MOSS to consider the application of standardization to farm and horticultural buildings, materials, components and equipment. British Standards are to be prepared for Dutch lights together with the associated supports and fastenings. It is intended to extend the preparation of British Standards to cover various components, material and equipment applicable to farming and horticulture, and the committees will be pleased to consider any suggestions for standardization which will contribute to increased efficiency and production. Any comments on this subject should be addressed to British Standards Institution, 24-28 Victoria Street, Westminster, London, S.W. 1.

National Gardens Scheme—We have been asked to announce that the address of the National Gardens Scheme is now 57 Lower Belgrave Street, London, S.W. 1, to which address all future enquiries should be sent.

Publications—The report of The National Fruit Trials, 1945-47, by J. M. S. POTTER will be available early in October, price 2s. 0d. post free. A pamphlet entitled *Practical Aspects of the Manuring of Fruit in Gardens*, by T. WALLACE, M.C., D.S.C., A.I.C., reprinted from the R.H.S. JOURNAL for January 1946, is also available, price 6d. post free, and may be obtained from the Secretary.

WISLEY IN OCTOBER

WHILE several of the larger floral displays may be ended by a severe frost before this month commences, others, particularly the Early Flowering Chrysanthemums and the Michaelmas Daisies, will be in full flower; Gentians, Crocus, hardy Cyclamen, Belladonna Lilies and other bulbous subjects brighten many parts of the Gardens, in harmony with the brilliant autumn tints in the foliage and fruits of numerous trees and shrubs.

Beneath the Laboratory wall, *Amaryllis Belladonna* will be at its best during the early part of the month, while the crimson foliage and blue flowers of *Ceratostigma plumbaginoides* (*Plumbago Larpentae*) form a vivid patch on the dry stone walls. The large plant of *Cotoneaster*

horizontalis on the west wall is covered in scarlet berries, while *C. conspicua decora*, *C. Dammeri radicans* and *C. microphylla* are all fruiting freely on the small rock garden near the glasshouses.

In the Half-Hardy House many of the plants noted last month are still in flower, with the addition of several hybrid Nerines, the small, sweetly-scented, white *Narcissus Tazetta* var. *Panizzianus*, the large pink trumpets of *Amaryllis Belladonna purpurea* and the pink flowered *Sedum Winkleri*. Trained on the roof support will be found *Clematis nannophylla* with small yellow flowers, and the well-known *Solanum jasminoides*; while the once widely grown *Bouvardia triphylla* planted in the border freely produces its small, pink, tubular flowers at this season.

The Temperate House also contains a fine collection of hybrid Nerines in pots on the side staging. On the centre bed *Erica canaliculata* is opening the first of innumerable white bells. The large Bottle-brush *Callistemon citrinus* var. *splendens* is in full flower near the roof glass, and the first pale-pink blossoms are opening on *Camellia Sasanqua* var. *fragrans*. Other plants of interest include *Abutilon insigne* with hanging red bells, the earliest Acacia, *A. platyptera*, and the sweetly scented *Buddleia asiatica*.

At the rear of the glasshouses the fine specimen of *Parrotia persica* has assumed its autumn mantle of crimson and gold; while in the Azalea Garden every bush is similarly clothed. The Viburnum collection also displays brightly coloured leaves with hanging masses of scarlet or crimson berries on many plants.

At the entrance to the Pinetum *Cotoneaster Wardii* carries arching sprays of orange-scarlet berries whose appearance is enhanced by the background of dark Conifers, while drifts of white and mauve *Colchicums* carpet the ground in many places.

Seven Acres contains a fine selection of fruiting Berberis, with berries of many shades of pink, scarlet, crimson, and in several species deep blue, or purple covered with a waxy blue-grey bloom. Beyond the pond a mound planted with hybrids of the deciduous kinds raised at Wisley is an interesting feature at this season with hanging clusters of scarlet fruits and orange-scarlet leaves. Cotoneasters and many Crab Apples are also fruiting freely; and beyond the Heath Garden where many late flowering Lings, *Calluna vulgaris*, are in bloom, the brilliantly coloured foliage of *Euonymus alatus* var. *apterus* and the pink and orange fruits of *E. yedoensis* are outstanding in a long border devoted mainly to trees and shrubs selected for their autumn colour.

The Wild Garden has few flowers to show, but the rarely planted American shrub *Cyrilla racemiflora*, with hanging white tassels, promises an unusually fine display if the early frosts are not too severe. Finely coloured trees in this section include *Oxydendrum arboreum* and *Liquidambar styraciflua*, while on a lower level *Fothergilla major* forms small mounds of clear yellow, a colour also seen in *Hamamelis japonica*. Many Vacciniums, *Enkianthus perulatus* and *Cercidiphyllum japonicum*, change slowly from green to scarlet, rose or salmon.

Towards the edge of the woodland the Chinese *Acex griseum* forms a picturesque small tree with red-bronze leaves and peeling bark.

On the Rock Garden the later-flowering Gentians and *Cyananthus* continue in bloom, with *Gentiana sino-ornata* one of the most conspicuous; *Zauschneria californica* is producing its last orange blossoms and the crimson flowers of *Schizostylis coccinea* are appearing near the Bog Garden. Round the borders of the ponds the tall, white flower-heads of *Saxifraga Fortunei* are fully expanded above the crimson-tinted, lobed leaves.

In the frames near the Alpine House the collection of *Crocus* species has several representatives in flower, including the small purple *C. asturicus* and *C. niveus* with white petals and bright scarlet stigmata.

Within the Alpine House many plants with striking coloured foliage help to maintain the display for the winter months when flowering plants are scarce in this section.

Near the long Rose Borders a round bed of *Viburnum tomentosum* has coloured almost every leaf a deep crimson and the many hybrid Crabs are hung with crimson fruit; several of the Cherries also display brilliant autumn tints, *Prunus Sargentii* being one of the most satisfactory in this respect, although the leaves are easily scattered by high winds.

The Early Flowering Chrysanthemums and the Michaelmas Daisy Trials border the grass walk beyond the Hornbeam hedges, and here flowers rather than coloured foliage provide the keynote of the display. The Dahlias will still be in flower during the early part of the month, provided a severe frost has not ended their flowering season.

The summer bedding has been removed and replaced with spring-flowering plants and bulbs; near the end of this path the inconspicuous, but sweetly-scented white flowers of *Osmanthus ilicifolius* perfume the air for some distance around the shrub on each still, autumn day.

Already the preparations for new plantings are being undertaken in several parts of the Gardens, and Battleston Hill will soon be the scene of further activity as the new path round the base of the hill is continued through another section of unplanted woodland.

For those who can make a longer tour of the Garden the many Rose species now in fruit in Howard's Field are well worthy of a visit, while the last flowers linger on the several varieties of *Hibiscus syriacus* also planted in this area.

A large trial of Brussels Sprouts occupies much of the Vegetable Trial Ground, and these will be almost fully mature during this month, while a number of other winter vegetables are also represented.

THE CULTIVATION OF CYCLAMEN PERSICUM

Allan G. Langdon

FOR some years now the Giant forms of *Cyclamen persicum* have been acclaimed among the most useful and decorative of our winter-flowering plants, and during recent years an unsatisfied market has arisen for them, particularly at Christmas time, chiefly for use as gifts. No doubt the shortage of textiles and other manufactured goods and the limitation of imports of Azaleas, etc., have considerably increased this popular demand, but one cannot help concluding that they are also being sought on their own merits, for they have proved themselves pre-eminent in their sphere as decorative plants for the greenhouse and home. It is certain that their existing popularity will be maintained and, when their limited cultural requirements are better understood and their versatility more fully appreciated, the demand for them will be further extended. The once-held opinion that Cyclamens are semi-exotic plants is dying fast, and most people are now convinced that they are no more difficult to retain in a presentable condition in the home than other winter-flowering plants and indeed few can vie with them for that purpose, for, given reasonable conditions which are by no means exacting, they can be kept in flower for several months and all this time their beautiful foliage alone warrants their use as decorative subjects.

Many tens of thousands are grown commercially each year, of which the majority find their way into the wholesale markets to be subsequently distributed through retailers into hotels, restaurants and private houses. It is when they arrive in the unaccustomed and unnatural atmospheres of such places that their beauty is inclined to wane unless, in the first place, they have been well grown and, secondly, that they are given conditions as near to their normal needs as these unusual surroundings permit.

Plants which are well grown are capable of withstanding for a limited period the rigours of transport, exposure to extremes of weather and dryness at the roots. To prepare them for this treatment they should have plenty of healthy roots and must also have been grown under cool conditions with flowers on stiff, self-supporting stems. Such plants will not be harmed by exposure to wind, rain or even a temperature down to freezing point for a short while and will defy the most casual treatment in the home for some weeks. On the other hand, plants which have been unduly forced into flower by excessive heat and moisture should be shunned at sight by both wholesaler and the buying public, for they will neither travel well nor will they survive more than a few days in a dwelling-house. These plants are easily distinguishable from the well-grown ones by the long thin stems of both foliage and flowers which often have to be supported by short sticks. Plants such as these are a travesty of the perfect Cyclamens, but fortunately the majority which are offered for sale nowadays are fairly well grown and can be purchased with confidence.

All Cyclamens, whatever degree of cultural skill is shown in their production, are grown in greenhouses with a fairly moist atmosphere,

and this should be borne in mind when finding a place for them in a dwelling-house, not that it is possible to emulate greenhouse conditions, indeed that is unnecessary, but the plants should be kept away from the driest rooms, which are those most in use. On no account put them in rooms which are heated by gas fires, the effects of which are fatal, but rather in rooms or halls which are well lighted and not too frequently occupied; a glass-fronted loggia will do admirably, and if it is possible to transfer the plants from the house into a greenhouse for two or three days each week their period of flowering will be considerably extended.

There is no doubt that the question most often asked relating to Cyclamens in the home has to do with watering, and how difficult it is to answer! A method often adopted, though not a good one, is to stand the pots in saucers or bowls which are kept filled. By all means stand them in a receptacle of some sort, but only as a means of collecting any excess of water which may percolate through the soil when the plants are watered from above. Some people hold that Cyclamens should not be watered from above but soaked by total immersion of the pot in a bucket; this opinion is, however, fallacious. Frequency of watering depends on root activity and the conditions under which the plants are growing; it will therefore vary considerably from plant to plant, and the best test as to whether a plant needs watering is to feel the soil, which should be neither bone dry nor sodden, but of a medium consistency. When it becomes necessary to water, give as much as the pot will hold, usually a tea-cup full, which will probably suffice for about a week. To give any plants, save aquatics, regular waterings irrespective of their needs, though a common failing, is a sure way of killing them—and quickly too. Watering, therefore, must remain, as it always has been, a matter of experience and discretion, and hard and fast rules are impossible to formulate for this, the most important and variable of all gardening operations.

Cyclamens, while being used as decorative plants in the home, will require neither fertilizer nor stimulants, but if it is possible to put them in a greenhouse occasionally as previously suggested, a weak solution of soot water every ten to fourteen days will help to prolong their flowering and keep the foliage in good health and colour.

When the plants have finished flowering, which will probably be in late February or early March—and provided the foliage is still in a healthy condition—consideration should be given as to whether it is desirable and possible to retain the corms for further use. It is, however, waste of time and effort to attempt to do so unless a greenhouse or frame, from which frost can be excluded, is available, but if either is at hand it will provide suitable accommodation for them until May. During this period of about two months give them as much light and genial air as possible and make sure they do not suffer from lack of moisture at the roots. The idea of completely “drying off” Cyclamen corms is erroneous. About the middle of May, when the possibility of sharp frosts has disappeared, transfer them to a shady part of the garden and plunge the pots in soil or ashes up to the rims, where they can remain until July. Whilst in the open the corms will lose most, if not all, of their

foliage, but this does not matter, as new leaves will eventually emerge to replace it.

Two methods are employed in preparing the corms for further service; one is to remove them from their pots and repot into fresh soil, the other is to top-dress them only. Generally speaking, the latter method will suffice. This entails removing the top two inches of old soil and replacing it with a fairly rich mixture containing equal parts of loam, well-decayed manure and sand, to which is added a sprinkling of soot. This mixture is pressed firmly around the corm, making certain there are no cavities. If, however, the corms are several years old—they have been known to survive for ten to twelve years—it will be well to adopt the first method and provide them with clean pots and completely new soil. This will necessitate taking the corms from their pots and removing all old soil and dead leaves but retaining as many of the roots as possible. Prepare a good soil, such as that subsequently advised for final potting, and when repotting take due care that the corms are well bedded in the soil, but not too deeply. The top or crown of the corm should be just covered with soil, and no more. A frame with a shaded light is an excellent place for these newly-potted or top-dressed corms, and they should be kept fairly moist by frequent sprayings (the frame being closed except during very hot weather) until growth commences, when air must be admitted as often as outside conditions will allow.

By September, strong plants with healthy leaves should be ready to place in the greenhouse, or, if no greenhouse is available, they can stay in the frame until the middle of October and then return to the lightest and most airy room in the dwelling-house. Unless conditions similar to those suggested above can be provided, it would be better to dispense with any idea of saving *Cyclamens* when they have finished flowering and purchase fresh plants each year, for after all they are not expensive, and a good plant in flower costs little more than a bunch of *Chrysanthemums*.

All *Cyclamens* must, in the first instance, be grown from seed, as there is no method of increasing them by vegetative propagation. To produce really good plants from seeds takes about sixteen months. Normally they are sown in August or early September, though a few growers prefer January sowing. This latter sowing, however, necessitates the maintenance of a fairly high temperature, which tends to soften the young plants so that they become "top heavy", *i.e.*, the foliage becomes disproportionate to the root. This condition may not be catastrophic in a particularly favourable summer, but should a hot, dry season ensue, they will suffer terribly and may possibly be of little use during the winter. The essence of successful *Cyclamen* growing is to keep plants well balanced at all times, and this condition demands a thoroughly healthy and ample root-system, without which partial failure is certain, though with it *Cyclamen* culture can be a straightforward and pleasurable occupation. Correct balance of growth in all plants calls for the avoidance of all excesses, and *Cyclamens* especially are intolerant of extremes of any kind, particularly in the early stages of their existence.

Early sowing of the seed, therefore, is advisable so that, with an even temperature and genial conditions over the sixteen months, sturdy

growth is produced which will enable the plants to withstand any subsequent erratic treatment or careless handling in markets, shops and dwelling-houses.

In broad outline the sequence of operations is to sow the seeds in August or September, transplant them into boxes in January or early February, pot into 3-inch pots in March or April and give them their final and flowering pots in June or early July. Plants given this routine will flower from October to the following February or March. Some growers, both professional and amateur, who have neither the room nor suitable conditions for seed raising, obtain seedlings from specialist growers in varying stages of growth during March and April and this practice is particularly recommended to the amateur, as it saves the six months or so during the most critical period of the plants' lives.

Boxes or pans can be used in which to sow the seeds, provided they allow thorough drainage, and whichever is used—boxes are the more usual—the soil need be no more than two inches deep. Some broken loam, leaf-mould or granulated peat must be placed over the bottom of the box, just sufficient to cover it, the soil then added, pressed firmly but not too hard until it is an inch from the top, and finished off tidily and with a level surface. The seeds can then be broadcast and covered with half an inch of soil. Another method is to make drills half an inch deep and one and a half inches apart, and sow each seed separately. This ensures that each seed has ample covering, and also that they are sown at a uniform depth. The drills are filled with soil, with gentle pressure, and well watered. A pane of glass over the box will prevent evaporation and a sheet of brown paper over the whole will exclude light and, under these conditions and in a temperature of 55° F., germination will take place in approximately five to six weeks. Some growers place the seeds between wet flannel for twenty-four hours before sowing, and while this may, and probably does, assist germination of seed more than one year old, it has little effect and is unnecessary if the seed is fresh.

While many soil mixtures have been successfully used in producing first-rate Cyclamen, the 'John Innes' seed compost has also proved very satisfactory and is recommended for this purpose. The loam used in the mixture should be matured fibrous loam, as ordinary garden soil is quite unsuitable.

When the seed-leaves appear through the soil the glass and paper must be removed and the box placed fairly near the roof of the greenhouse. This will help in producing stocky growth. Watering must be done judiciously, as the seedlings abhor both dry and sodden soils, and, on every possible occasion during mild weather, the ventilators of the house should be opened slightly, care being taken to avoid draughts which are at all times detrimental, although the beneficial effects of careful airing during the early period of growth will be apparent throughout their existence.

During January and early February, the seedlings, each of which should now have two or three leaves, will be ready to transplant into other boxes, using a similar soil to that recommended for seed-sowing, and giving them about two inches each way. They should be planted

firmly, the small corms being just covered with soil. Too deep planting will result in spindly leaf-stems and make subsequent potting difficult.

As the days lengthen growth will be more rapid, and about eight weeks after reboxing the seedlings should have produced an excellent root-system and will be ready for their first pots, either 3-inch or 3½-inch according to their vigour.

It will be necessary to have more nutriment in this potting soil than that suggested for seed-sowing, and the 'John Innes' final potting mixture will prove excellent for the purpose. Potting *Cyclamens* calls for the usual details to be observed common to all potting operations, viz., clean pots, ample drainage, etc., and a soil which is neither too wet nor too dry.

Considerable care is needed when removing the seedlings from the boxes to ensure as little damage to the roots as possible, and when potting, the roots must be spread carefully over the soil, since growth will be retarded if they are bunched. Potting should be moderately firm, and when finished the corm should be just covered with soil as before. It is unnecessary and indeed harmful to pot deeply, as "damping-off" may set in and, anyway, most roots are formed at the base of the corm, while few if any emerge from the side or top. After watering the newly-potted plants, they should be covered with newspaper for a few days if the sunlight is strong—it probably will be in April—as wilting must be prevented. The roof of the greenhouse will, of course, have been shaded sometime in March and the ventilators should not be used too freely for a few days following potting, but subsequently ventilate as freely as possible on suitable occasions. Again, watering must be carried out with diligence; moist but not wet conditions are ideal, and the frequency of watering will depend on the prevailing weather, size of greenhouse, etc., but, it should be remembered, more plants of all kinds are spoilt by over-watering than by under-watering. It is also a good plan to stand the pots on staging covered with ashes or shingle, as this will minimize the necessity to water; in fact open staging is inadvisable for *Cyclamens* at all times. Overhead spraying with rain-water, both morning and evening, will add considerably to their well-being by inducing healthy foliage.

About eight weeks is usually sufficient for the 3-inch pots to become filled with roots, when the final move into 5-inch or 5½-inch pots (according to the size of the plants) should be made. The soil as recommended for the previous potting will do admirably, and here again, when the potting is finished, the corm should be just covered with soil; for with the subsequent waterings over a long period, together with the normal development of the corm, it will eventually become uncovered and its crown will be quite free of soil by the time the flowers appear.

These newly-potted plants should be fairly heavily shaded and ventilation limited for a few days, but once they have recovered from the move and new leaves appear—a sure sign of root activity—coddling in any form must be avoided, and if cold frames are available they provide admirable accommodation for them from June to September, even though manipulation of the lights may prove wearisome; but whether the plants are kept in a cold greenhouse or put into frames,

similar conditions will be necessary if vigorous growth is to result, and while at all times being shaded from bright sunshine, free movement of air, excluding draughts, must be permitted during warm weather. Frequent overhead sprayings, too, will be most helpful and will assist in lessening the possibility of pest invasion. It is an excellent plan to remove the frame lights entirely during warm nights and showery weather; nothing one can do will help more to produce sturdy growth, which is so essential to complete success.

Fortunately, Cyclamens are not troubled by many pests, and it is usually because of dry conditions that the few pests which attack them are apt to make their appearance. Thrips and greenfly are the most common invaders, and the former can be quite devastating once they become established.

Fortunately, both are easy to destroy and easier still to prevent. To this former end, occasional sprayings of D.D.T. glasshouse emulsion will deal with thrips, and liquid nicotine will prove effective against greenfly. Prevention, however, should be aimed at and alternate fortnightly sprayings of D.D.T. and nicotine during the summer will keep the plants clear of any trouble from these sources, and during the winter months periods of four weeks will suffice.

By August the plants should be well established, when occasional feeding with liquid manure will be advisable, but as Cyclamen will not tolerate strong feeding, a little and not too often must be the rule. Soot-water is among the safest and best liquid foods and is easily prepared by putting a small sack of old soot in a tub or tank of rain-water and letting it stand for a fortnight before using.

The resultant soot-water should be diluted to the colour of strong tea and this can be given them each fortnight or so, remembering that over-feeding will encourage the production of foliage at the expense of flowers. There are also proprietary fertilizers which can be used with safety and success.

During August and September the first flower-buds will probably appear above the foliage and, unless particularly early-flowering plants are needed, they should be removed. This is done by holding the stem firmly between the thumb and forefinger and giving it a sharp vertical pull which will remove the entire stem from the crown of the corm and lessen the possibility of rotting which may occur if a portion of the stem is left on the plant. This method should be used to remove any withered flowers and leaves which will appear from time to time, and may save the plants from complete collapse.

All Cyclamens growing in frames must be housed by the end of September in a temperature of 55° F. A higher temperature will frustrate much of the labour previously expended upon them by encouraging soft growth, and no apology is needed for repeating that the *sine qua non* of Cyclamen culture is providing as far as possible an unvarying temperate atmosphere and the avoidance of cultural spasticity, by which consistently steady growth is encouraged from germination of the seed to maturity.

SOME FURTHER NOTES ON GINKGO BILOBA

TREES IN THE OPEN COUNTRY NEAR PEKING; THE OLD TREE AT UTRECHT;
THE WASHINGTON AVENUE; GINKGOS AT MILAN

Humphrey Prideaux-Brune

TREES NEAR PEKING

MR. BAKER-CARR's colour photograph shows the trees in their full beauty of autumn tincture. Unfortunately it has not been found possible to reproduce it in colour, for inclusion in this set of illustrations. The monochrome reproduction, however, brings out clearly other striking points in this skilful composition. (Fig. 128.)

The setting is typical of the scenery in the Peking plain. The trees stand in open farmland, not far from the north-west angle of the city walls, and just off the road, seven miles long, which leads from the city to the Summer Palace. In the background is seen part of the range of the Western Hills which overlooks the Summer Palace and its lake. This classic range was for centuries a favourite haunt of emperors, and also, in the more recent past, of members of the foreign colony in Peking. The group in the foreground of MR. BAKER-CARR's picture serves both to emphasize the scale of the trees and as a symbol of the life of the fields, the tradition of toil and endurance which combines with the glamour of imperial associations to form the twofold romance of the plain of Peking. It is a singularly appropriate setting for the tree which has lived through all the ages of human achievement and endeavour, a link with the "immeasurable past" and an emblem of continuity, with its renewal year by year of golden radiance, brief but confident, against the blue of the autumn sky.

THE OLD TREE IN THE BOTANICAL GARDEN OF THE UNIVERSITY, UTRECHT
DR. BOTTELIER has very kindly supplied the following notes on this famous specimen.

A paper (in Dutch) on the *Ginkgo*, by PROFESSOR PULLE, states that it is not known when the tree was planted. The first written record of it is in a paper by J. F. JACQUIN, 1819:

"In England, especially in Kew, 30 years ago, large specimens were to be found, the largest, and most probably the oldest, specimen, however, which I saw on my travels through Germany, Holland, England, France, and Italy, was the one which I saw in the botanic garden at Utrecht in the year 1788."

There is also the following reference in LOUDON, *Arboretum et Fruticetum Britannicum*, vol. iv, p. 2095:

"If the estimate made by Professor Kops as to the age of the *Salisburia* growing in the Botanic Garden there be at all near the truth it must have been first introduced into Holland between 1727 and 1737, and, from the connection of the Dutch with Japan at the time, we think this highly probable." "The tree at Utrecht, which is supposed to be between 90 and 100 years of age, and consequently the oldest in Europe, though not large, still produces vigorous shoots."

(KOPS was Professor of Botany in Utrecht at that time).

The present Utrecht Botanic Garden was laid out in 1733, and so most probably the tree was planted between 1733 and 1740, when

J. SERRURIER was Professor of Botany. Whether it was obtained from KAEMPFFER is not known, but judging from the dates (KAEMPFFER visited Japan in 1690) it seems improbable.

In April 1947 the height of the tree was 18·60 metres, and the diameter at 1 metre above the ground about 1 metre. In 1835 its height (LOUDON, *l.c.* p. 2099) was 33 feet 2 inches, diameter at 1 foot above the ground 1 foot 6 inches. In 1816 the age of the tree was estimated to be 70–80 years.

It is a male specimen. At 9·31 metres from the ground it bears a female branch which in 1918 for the first time showed a rather large number of fruits. The second time when it had many fruits was in 1942. In 1943 it had only four. (Figs. 124 and 125.)

THE WASHINGTON AVENUE

This famous avenue unfortunately no longer exists, having been removed to make way for road improvements (Fig. 122). The British Commonwealth Scientific Office in Washington has kindly furnished the following note:

"In all likelihood the Washington *Ginkgo* trees came from a Mr. H. R. Siebrecht, of New Rochelle, New York, who sent the famous avenue trees as small bare-footed saplings to be planted. They were mostly females, and were very probably planted by Mr. Wm. Saunders, Horticulturist, who was Superintendent of Grounds of the U.S.D.A. in 1866 when *Ginkgo* trees were introduced into Washington. Since Mr. Siebrecht's trees were planted between 1868 and 1870 it is likely that Saunders planted these also.

"These trees are not subject to disease, and most of the remainder of the trees in the district have been and are planted from seedlings. The female trees grow rather upright, but the branches of the males spread rather farther out and are generally more attractive."

The picture taken near Peking is a Kodachrome photograph by MR. D'A. BAKER-CARR, who most kindly allowed the negative to be sent from China for the purpose of reproduction in the JOURNAL. The other photographs were obtained through the good offices of the British Council. The two views of the Utrecht tree were very kindly supplied in response to a request from the Council, by DR. H. P. BOTTELIER, Director of the Botanical Laboratory at Utrecht, and that of the avenue which formerly existed in Washington, D.C., by the U.S. Department of Agriculture. Our best thanks are due to MR. BAKER-CARR, DR. BOTTELIER, the U.S. Department of Agriculture, the British Council's Agriculture Department in London and its representative in the Netherlands, and the British Commonwealth Scientific Office in Washington, for their kind help which has made it possible to assemble this group of photographs.

GINKGOS AT MILAN (FIG. 126)*

The two *Ginkgo biloba* trees were undoubtedly brought over from North America by the Milanese botanist, CARLO CASTIGLIONI (botanist in the then sense of the word, *i.e.*, a collector, traveller and importer of plants). He undertook various voyages between 1799 and

* For the photographs of the trees at Milan we are indebted to the British Council and its Science Officer in Rome, and we have also to express our special thanks to Professor Ugo Brizi, of the Brera Botanical Gardens, who made the photographs available and also most kindly supplied this note on the history of the trees.

1807, and it is not known exactly when he brought over the numerous *Ginkgo* specimens together with the gloomy *Robinia* or *Acacia*. These specimens were therefore given to the Brera Botanical Gardens during the Napoleonic period, between 1800 and 1807. Only two of them survived, fortunately a male and a female. When a permanent place was found for them, they must have been about six to ten years old.

More detailed information was available later after the formation of the Austrian Government, when the Brera Botanical Gardens passed into the hands of the Jesuits. The writer saw an authentic document, shown to him by his predecessor, PROF. ARDISSONE, which was no longer in the Brera archives after the latter's death, being transferred elsewhere as mentioned below.

The document in question, which was a copy of the official report made by Jesuit Father FULGENZIO WITTMAN to the Austrian Governor, COUNT FIRMIAN, gave an account of the condition of the Brera Botanical Gardens and referred to the two surviving *Ginkgo biloba* trees which attracted attention on account of their beautiful foliage similar to that of a large Maiden-hair.

WITTMAN confirms the presence of the trees up to 1807, and points to the error on the part of the botanist CASTIGLIONI, who, as he had brought them over from America along with other American specimens, thought that the *Ginkgo* was a native of America, whereas, as is well known, it originally came from Japan or China, where it has always been cultivated extensively as an ornamental tree.

Both trees continued to thrive. They had become fine large trees round about 1850, and when ARDISSONE took over the administration of the Botanical Gardens in 1870, they were gigantic and majestic. Both of them were of a considerable height, and the foliage and the branches were regular and imposing. Towards the end of the century, however, they began to decline for various reasons, in the first place owing to the branches being excessively high they broke easily, and also because it was found necessary to cut some of them, which were dangerous owing to their weight. Furthermore, the suppression of the private gardens surrounding the Botanical Gardens on the side of the Via Monte di Pietà and the construction of high buildings prevented the normal growth of the two trees, which also suffered damage during some very severe winters, like that of 1903, when several large branches broke under the weight of the snow.

From 1910 on, after the death of ARDISSONE, the trees were well cared for by the latter's successor, the undersigned, bore flowers almost every year, and in some years, as in 1914, seed was produced amounting to 25 kilos, which was distributed to various Botanical Gardens and had been specially requested by Vienna and Russia, whence, most probably the descendants of those historical trees have invaded perhaps the whole of Europe.

The deterioration of the trees continued, however, the big branches being broken by the abundant snow-falls, until the *coup de grâce* of July 31, 1931, when a violent cyclone devastated the Botanical Gardens, uprooted a more than century old Lebanon Cedar, damaged numerous plants and took the top off both of the *Ginkgo* trees, breaking and spoiling

the highest branches. The violence of the hurricane was such that both trees were almost laid bare, and the leaves and young shoots were found dispersed in various parts of the city and even in the Piazza della Scala. Since then, the trees have somewhat recovered and are quite fine specimens but can in no way be compared to what they were at the beginning of 1900.

That is all I can say regarding the *Ginkgo* trees, which according to the information referred to, should be about a century and a half old.

PROF. UGO BRIZI

NOTES FROM FELLOWS

Nomocharis Mairei

THIS species, the best in my opinion of the genus *Nomocharis*, has persisted here for many years in full sun in a raised deep bed of leaf-mould and sand overlying a foot of pebble drainage with a ground covering of *Parochetus communis*. The bulbs are planted deeply—both KINGDON-WARD and FORREST continually emphasise the fact in their writings that *Nomocharis* bulbs are always deep down, eight to ten inches underground—and in these conditions *N. Mairei* has proved equal to hot sun and drying winds, always a menace to these plants on the South Coast. Incidentally the *Parochetus communis* also flowers well and maintains itself, with no winter protection, under these conditions (Fig. 131).

F. C. WOOD

Durrington, Worthing.

Wistaria venusta

Wistaria venusta was awarded a First Class Certificate by the Royal Horticultural Society on May 4, 1948 when it was shown by COL. STEPHENSON R. CLARKE of Borde Hill, Hayward's Heath, having previously been given an Award of Merit on May 1, 1945, when exhibited by MESSRS. R. C. NOTCUTT, LTD., Woodbridge (see R.H.S. JOURNAL, vol. LXX (August 1945), pp. 247 and xxxvii).

In my opinion this is the finest white flowered *Wistaria* in cultivation. The flowers are individually larger than those of other *Wistarias* and last longer in bloom, being of firmer substance. They are profusely borne in stout racemes on both short spur-like growths and long one-year-old shoots. The foliage is dark green and very attractive. Although it grows as a strong climbing plant it also responds well to training in the form of a standard or bush. For this purpose the young tendril-like shoots must be cut back annually in July or August.

Considerable confusion existed at one time regarding the correct name of this plant, and the following notes, which are by no means exhaustive, may help to clarify matters. For those desirous of reading a fuller account reference should be made to the description given in SARGENT'S *Plantae Wilsonianae*, vol. 11 (1916), p. 514.

W. venusta has been found both in Japan and China, but only as a cultivated plant in Japan, where E. H. WILSON described it as growing in Temple Gardens and referred to as "Shiro-fudsi" or White Wistaria. It is recorded as having been found in the wild state in China in 1913 by F. N. MEYER.

The first appearance of this fine plant in Europe was when it was exhibited in the Japanese Section of the International Horticultural Exhibition at Chelsea in 1912, and mention of this is made in a note by MR. CHITTENDEN in the R.H.S. JOURNAL, vol. XLVIII (September 1922), p. 230, and also by MR. BEAN in vol. II of his book *Trees and Shrubs Hardy in the British Isles*, fourth edition, p. 680, where it is stated the plant was exhibited under the name of *W. brachybotrys*. The specific name *venusta* is given with much fuller details, however, in the third volume of MR. BEAN'S work on p. 505.

There is a good illustration of a single raceme in the *Botanical Magazine*, t. 8811, and a photograph in the R.H.S. JOURNAL, vol. LIX, part 2 (July 1934), Fig. 99, of a growing plant in MR. HUGH WORMALD'S garden at Heathfield, East Dereham, Norfolk. It was from this plant that the specimen illustrated (Fig. 137) was raised. The late MR. R. C. NOTCUTT brought back grafts from MR. WORMALD'S garden in February, 1931, and planted a resultant plant in the garden of his private house, "Topfields," Woodbridge, where it continues to grow vigorously.

F. P. KNIGHT

Agave attenuata in Southern Rhodesia

The photograph shows *Agave attenuata* growing in a garden five miles from Salisbury in Southern Rhodesia (Fig. 129). This *Agave* came from the Huntington Botanical Gardens in California in 1936, in exchange for *Aloe excelsa*, and it flowered here for the first time last year.

As will be seen by the photograph, it seems to like its new home. It first showed signs of flowering towards the end of February, and took about six weeks before it started to turn and, after forming an arch, began to descend. It was in flower fully six months and, by the time the tip was flowering, the flowers at the base were gone and the seed pods were ripening. The flower stalk was 26 feet long, and the arch 9 feet high, the circumference of the flowering stalk was about 32 inches. The flowers are greenish on the outside and a dirty white inside.

This plant caused considerable interest to all who saw it, as nothing of its kind had been seen before. Almost every comment was, it looked like some pre-historic animal, possibly a swan. When it was about 6 feet high, it looked for all the world like a puff adder rearing up, particularly on a bright and clear moonlight night.

Our garden boys were very superstitious about it, they considered it was the work of the devil, "tagati" (some evil spirit), and would not go anywhere near. When it began to descend and come back to the earth, they were sure it was now going back to where it came from.

G. D. CLARKSON

Rosa Wardii

Among the Roses introduced by CAPTAIN KINGDON-WARD in his expedition to south-eastern Tibet in 1924 was one under the seed-packet number 6101, since named *R. Wardii*. We have grown this species for six or seven years and found it very attractive, always arresting the attention of visitors interested in wild Roses. It is not a brilliant shrub, either in flower or fruit, but it does possess quality—that “tone” so characteristic of *R. Moyesii* to which it would seem to be allied botanically. It is, in truth, a “White Moyesii” to the average eye, differing only in being of lesser stature and smaller in all its parts than its distinguished relation. Here it has made an open habited bush of 6 feet, with stiffly arching branches, the leaves being composed of three to five pairs of ovate or elliptic, finely serrated, pale green leaflets, $\frac{1}{2}$ to 1-inch in length. The usually straight thorns are few and nut-brown, and the young wood tinted with red. Appearing in early June and continuing until mid-July, the wide petalled, perfectly formed flowers, 1 to 1 $\frac{1}{4}$ -inches across and saucer-shaped, are firm in texture and a dead white with a dense wreath of yellow around a distinct red-purple “eye”. These flowers, with the characteristic *Moyesii* poise, are borne, not profusely, usually singly at the tips of short laterals, but pairs or threes may occur. The fruits which follow, smooth, glossy and bright red, are oblong, narrowing to the persistent calyx, and about 1 inch in length. Seed is anything but plentifully produced, but what there is germinates freely. This rose is still, it seems, rare in gardens, but it should appeal strongly to every grower of the species. I have found it perfectly hardy, enduring sub-zero frosts on several occasions, and our specimen has always been in the best of condition and pest-free, the soil being a lime-free alluvial loam, with sharp drainage. (Fig. 123.)

A. T. JOHNSON

A hybrid Glaucium

Glauciums, or Horn-poppies, have never found great favour with gardeners, partly because they are little known, because they do not flower with the abandon which we have been led to expect of good perennials and biennials and also, perhaps, because they are only suitable for sandy or at least light soils. They can, however, be recommended to those who are unfortunate enough to have an over-light soil and, in a sunny place, their rosettes of grey leaves are handsome in winter. In summer there is a long succession of poppy-like flowers which, later in the season, continue to open among the long curving seed-vessels from which the plants take their name.

Seeds of *G. luteum*, the Horn-poppy of our coasts, and of *G. tricolor* from the Mediterranean, were sown in the very sandy garden of my cottage in Suffolk and the two species have now been established for some ten years, seeding themselves freely. Last year I noticed that a natural hybrid had appeared and seed from these plants seem to reproduce true to type. The flowers are a clear orange, intermediate between the primrose of *G. luteum* and the flame colour of *G. tricolor*,

while there remains only a bare suspicion of a dark mark at the base of the petals to remind one of the black and yellow marks typical of second species.

I find that, if the *Glauciums* are cut down at the end of the summer they are to all intents perennials, increasing in size year by year with a woody root-stock. I can recommend them as unusual plants suitable particularly to the arid parts of a wild garden, which are often difficult to furnish.

Royal Cottage, Kew

HUGH FARMAR

The Propagation of Metasequoia by Cuttings

Through the generosity of the Director of the Arnold Arboretum and of DR. HU of the Fan Memorial Institute in sending seeds, there are now at the Royal Botanic Garden, Edinburgh, as at other establishments in this country, seedlings of *Metasequoia glyptostroboides*. The total number of plants at present in the country cannot, however, be very great—probably about three hundred—but, fortunately, the species seems to be no more difficult to propagate, at least by softwood cuttings, than that other remarkable Chinese Gymnosperm—*Ginkgo biloba*.

Three entire branches of *Metasequoia*, each about 4 inches long, were isolated on July 16, 1948, and inserted in a frame where alpine are propagated. The rooting medium in this frame was crushed pumice, unheated, and with a natural temperature of 65° F. at this time of year. Exactly three weeks after insertion, that is on August 6, root tips began to emerge from two of the cuttings. The first root from the third, which was the most vigorous cutting of the three, was later in appearing and did not become visible until August 10. In order to hasten root development, this cutting was transferred to a warm-temperate propagating case for two days to allow the accompanying photograph (Fig. 127) to be taken on August 12—four weeks but a day after the cuttings were inserted. Judging by the behaviour of the shoot transferred to the warm temperate propagating case, it was obvious that the cuttings would have satisfactorily withstood much warmer conditions: possibly the optimum temperature of the rooting medium for *Metasequoia* will prove to be about 70–75° F.

If the behaviour of these three cuttings is found to be characteristic of *Metasequoia*—and the writer has little doubt that such will be the case—then, *Metasequoia* will root more readily than any other member of the *Taxodineae* with the single exception of *Cryptomeria japonica* in its juvenile phase—the so-called variety *elegans*. Next to *Metasequoia* in order of rooting facility comes *Cunninghamia*, *Cryptomeria japonica*, *Sciadopitys* and *Sequoia*; but none of these presents any difficulty. In cuttings of *Taxodium* also, rooting takes place readily, and similarly in *Taiwania* provided that suitable cuttings are obtained.

According to MR. YÜ of the Yunnan Botanical Institute at Kun-ming, at present at the Royal Botanic Garden, Edinburgh, the Chinese foresters in the Province of Hunan plant out 12 inch long newly prepared cuttings of *Cryptomeria japonica* and *Cunninghamia* directly upon permanent

forest sites, as a forester in this county plants out three-year-old seedlings of Spruce or Pine. The Chinese foresters perform this operation in April and May at which time the wet season begins in this part of China. Such a method of propagation would hardly be possible in this country owing to insufficient atmospheric humidity during the late spring and early summer; for this reason it would obviously be impracticable on the East Coast. The humidity in winter would, of course, be adequate in many parts of the country, but the soil temperature, except possibly in the extreme south-west of England and Scotland would then be too low. It is for these reasons that we in our climate must propagate these subjects in frames. The writer has not attempted to root cuttings of *Glyptostrobos* which is the only other genus in the *Taxodineae* so far unmentioned.

E. E. KEMP

Royal Botanic Garden, Edinburgh.

THE BULB AND STEM EELWORM IN RELATION TO GARDEN PLANTS

G. Fox Wilson

ENTOMOLOGIST TO THE ROYAL HORTICULTURAL SOCIETY

(Lecture given on July 20, 1948. J. RAMSBOTTOM, O.B.E., M.A., D.SC.,
F.L.S. in the Chair.)

THE Bulb and Stem Eelworm, *Anguillulina dipsaci* Kühn, has been known for a number of years under various names, both scientific, namely, *Tylenchus devastatrix* Ritzema Bos and *T. dipsaci* Bastian; and common, e.g. the Bulb, Daffodil, Onion, Parsnip, Phlox, Potato and Strawberry Eelworm as the case may be. Such terms are unfortunate and confusing, especially where such names as "Potato Eelworm" and "Strawberry Eelworm," for instance, refer to infections of distinct species of *Nematoda*, namely, to *Heterodera rostochiensis* Woll. and *Aphelenchoides fragariae* Ritz. Bos respectively.

The Eelworm under discussion is both an important agricultural and horticultural pest, attacking cereals, especially Oats ("Tulip Root" or "Segging"), Clover ("Clover Sickness"), Potato tubers and Pulse crops, including Beans and Peas.

Distribution. *A. dipsaci* has a wide geographical range, having been recorded from all European countries, including the British Isles; North and South Africa; North and South America; Asia Minor; Australia and elsewhere.

Host Plants. The total number of recorded host plants in all countries is 329 arranged in some 40 Natural Orders; of these, there are 129 British hosts, GOODEY (18), and *in litt.*

The number of host plants is exceeded only by one other species of plant-parasitic Nematode, namely, the Root-Knot Eelworm, *Heterodera marioni* (Cornu) Goodey, with over 800 hosts to its record.

The chief hosts of this Eelworm so far as garden plants are concerned are set out in *Table I*, though many others, including weeds, are affected to a greater or lesser extent. The important role that weeds play in serving as "reservoir" or "bridging" hosts of this eelworm will be discussed later.

TABLE I

Some Garden Host Plants of the Bulb and Stem Eelworm

ORNAMENTALS

Hyacinth (13)	Primulas (4, 16)
Iris, Bulbous (25)	Saxifrages (11a, 17)
Narcissus (33)	Scillas (5, 33)
Oenotheras (8)	Tulip (19a, 20)
Phlox, Annual and	Wallflowers (12, 27)
Perennial (6, 8)	

FRUIT

Strawberry (26)	Tomato (36)
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VEGETABLES

Carrot (12)	Parsnip (16, 35)
Onion (19, 20a)	Potato (10)
Mangold (11)	Rhubarb (28, 29)

Description. The male and female eelworms are described in detail by GOODEY (13) *et alii*, and it is unnecessary here to give complete descriptions of the species.

The *Adult Eelworm* is a microscopic creature varying from $\frac{1}{16}$ to $\frac{1}{8}$ inch in length, eel-shaped, with a somewhat rounded head end in which may be seen a spear-shaped stylet or oral spine; and the tail end gradually tapering towards a point. The sexes are distinct, and both retain the eel-shaped form throughout their lives. The female is characterized by the presence of ovaries; the male by a pouch or bursa at the posterior end of the body, together with a pair of spicules.

The *Eggs* are variable in size, measuring 0.07–0.095 mm. in length and 0.03 mm. wide, and somewhat kidney-shaped.

The *Larvae* resemble their parents, and growth proceeds until a pre-adult stage is reached. The last mentioned stage is capable of revival following long periods of quiescence, which is possible owing to the presence of an abundant supply of reserve food in the form of fat globules.

Life History. The eelworms breed rapidly under favourable conditions, and all stages—eggs, larvae and adults—may be found in infected parts of plants, including rapidly growing stem and leaf tissues, and in storage tissues (e.g. Narcissus bulbs and Potato tubers). When decay of the plant sets in, they either leave the tissues and enter the soil to seek other hosts, or they remain in the dead tissue and become dried up (desiccated) with it. Masses of pre-adult larvae may frequently be seen with the naked eye in the form of "eelworm wool" issuing from lesions between the basal plate and the lower end of the bulb-scales of infected Narcissi. This so-called "wool" consists of large numbers of desiccated pre-adult larvae, which are capable of

remaining viable—provided they remain dry—for periods varying from 4 to 6½ years, GOODEY (13).

Within the host plants, the eelworms occur chiefly in the cortical cells and live and feed amongst the intercellular spaces of the stem and shoot. They also invade leaf-stalks, leaves, flower stems and inflorescences, and may be carried in and on seeds.

The usual points of entry are natural openings on the plants' surface, and they affect entry through the lenticels and stomata (breathing-pores) of the stems, shoots and leaves, through lesions, among loose cortical cells at the base of a stem where a rootlet burst through, and at the extremities of the "eyebrows" overhanging the "eyes" of Potato tubers, GOODEY (14).

The pathology and aetiology of plant lesions caused by parasitic eelworms has been fully discussed by GOODEY (11, 14), and those who are specially interested in the manner in which Nematodes injure plant tissues and the reaction of the plant to invasion by these organisms are referred to the literature cited.

Symptoms of Attack. An infection of microscopic organisms, in this case eelworms, becomes apparent to the average horticulturist by the signs of attack on the host plant. The infection is thus made manifest by the unhealthy or malformed condition of the plant. It is unwise, however, to rely entirely upon "symptoms" in determining the species of eelworm concerned with a particular diseased condition, and doubtful instances of diseased condition in plants should be submitted to a competent authority.

The injury caused by plant-parasitic eelworms often results in secondary invasions of other organisms, e.g. bacteria, feebly parasitic fungi, free-living species of eelworms, mites, millepedes and numerous species of insects, which are saprophagous in their habits (i.e. their food consists of a diet of dead and decaying organic matter). Many such organisms extend the initial injury, and frequently mask the effect of the organisms primarily concerned with the damage.

Provided that due consideration is paid to "cause and effect" in relation to eelworm infections, and to the subsequent invasions of damaged plant tissues by secondary pest and disease organisms, the value of disease symptoms in diagnosing eelworm attack is considerable.

The signs of attack by the Bulb and Stem Eelworm on some of the more common host plants in gardens are outlined, and symptoms on other hosts (Table I) are described in the literature to which references are given.

Hyacinth. The leaves exhibit yellow flecks and blotches, and become distorted, stunted and split. The flower spikes are malformed and dwarfed (Fig. 132 A). The "brown ring" symptoms, which are strikingly apparent in diseased Narcissus bulbs, are seen when the infected bulb is cut transversely. In severe attacks, many of the scale-leaves become thickened and split (13).

Narcissus. The leaves and flower-stems are dwarfed, distorted and yellowish-green in colour (Fig. 132 B). In addition, there may occur on the leaves small, yellow, blister-like swellings or "spickles," which may be felt when the foliage is drawn between the fingers. The bulb becomes

soft, and, when cut transversely, shows the "brown ring" symptoms (Fig. 132 C). The basal plate breaks away from the scales in severe attacks (33).

Oenothera. The leaf-stalks and basal portions of the leaves become swollen (8), while the growths are angled and intertwined (Fig. 132 D). Secondary invasions of a bacterium, *Corynebacterium fascians* Dowson, may occur and give rise to a proliferation of the basal buds, known as "Leafy Gall" (31, 32).

Phlox. The leaves become very narrow or strap-shaped, blistered or inflated, and waved at the edge. The petioles (leaf-stalks) lengthen and are brittle (8). The inflated appearance of the foliage is due to an increase in the volume of the intercellular air space arising from the dissolving action of the substances poured out by the parasite in the cellular tissue (14). The stems become spindley and brittle with long internodes, or swollen and soft (Fig. 133 G). The stems may split, though this same phenomenon may follow the effect of spring frosts, which cause the epidermal cells to rupture on lush, sappy growth (Fig. 133 F). The absence of distorted foliage on such shoots will, however, indicate that climatic conditions alone are responsible for the ruptured tissues. "Leafy Galls" are also associated on occasion with eelworm disease of herbaceous Phloxes (31, 32).

Primulas. The leaves become discoloured and/or blotched. The flower stems are malformed, stunted, generally flaccid, and speedily decay (Fig. 133 H). The tissues around the crown of the plants rapidly decay. There is great variation in the length of the internodes between the whorls of flowers in the Candelabroid types of Primulas, while the number of whorls is reduced. The flowers are small, pale in colour and poor in form (4, 16).

Saxifrages. The leaves are blackened at their base, and this is soon followed by a rotting of the crown in the case of *Saxifraga Cotyledon* and its variety *caterhamensis* (11A, Fig. 132 E). Many of the eelworms in one plant submitted to DR. GOODEY were found to be ensnared and killed by the hyphae of the fungus *Arthrobotrys oligospora* Fres. (17).

Onion. The term "bloat" is applied to infected plants owing to the swollen appearance of the bulbs and foliage. The leaves are undersized, considerably swollen and distorted (Fig. 133 i). The "neck" region is unduly thickened and the tissues are soft and flabby. The bulb becomes flaccid, irregular in shape, and complete putrefaction soon sets in. Late infections may allow the plants to produce sizeable bulbs, but the decay will continue in the store and the bulbs rendered useless (19, 20a).

Potato. There are no typical signs of attack on the foliage and haulm other than an unhealthy colour of the plants, together with dwarfed growth. Small discoloured areas occur on the surface of the tubers beneath which the tissues are discoloured (Fig. 133 j). Later, cracks and shrunken areas appear on the surface. Finally, and to a greater degree in tubers that are clamped or allowed to remain in the ground late in the season, the tubers rot. Their rapid decay is hastened by the invasion of numerous secondary organisms. The earlier symptoms of attack within the tuber closely resemble those of Potato Blight (*Phytophthora infestans*), and it is not uncommon to find both organisms in the same tuber.



U S Forest Service

SOME FURTHER NOTES ON *GINKGO BILOBA*

Fig 122—The Washington Avenue, U S A (See p 329)

Fig 123—*Rosa Wardii* (See p 333)

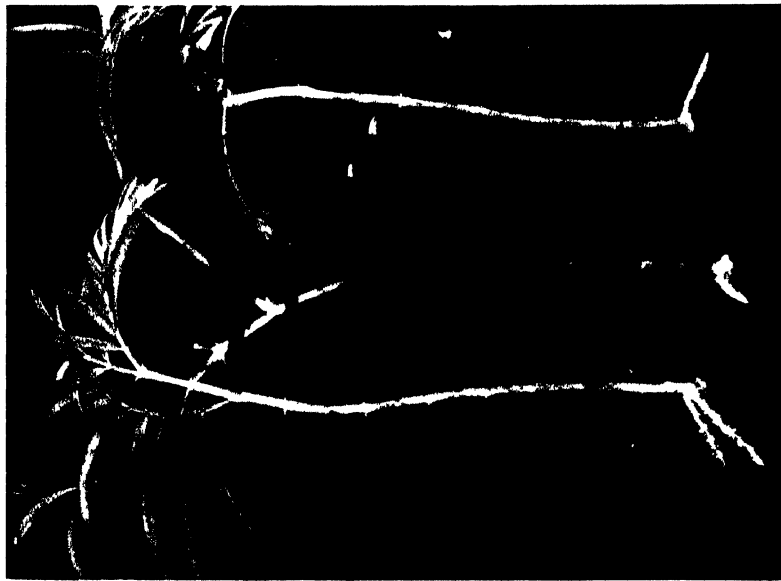
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SONIF FURTHER NOTES ON *GINKGO BILOBA*

Figs. 124 and 125—Ginkgo tree in the Botanical Garden at Utrecht University (See p. 329)



Photo, E. E. Kemp

Fig. 127—The propagation of *Metasequoia glyptostroboides* by cuttings (See p. 334)



Fig. 126—Ginkgo tree at Milan (See p. 329)



Photo, D'A. Baker-Carr

SOME FURTHER NOTES ON *GINKGO BILOBA*

Fig. 128—Ginkgo trees near Peking (See p. 328)



Photo, E. C. Bertram

Fig. 129--*Agave attenuata* in Southern Rhodesia (See p. 332)



Fig 130—A well-grown plant of *Cyclamen persicum* (giant strain)

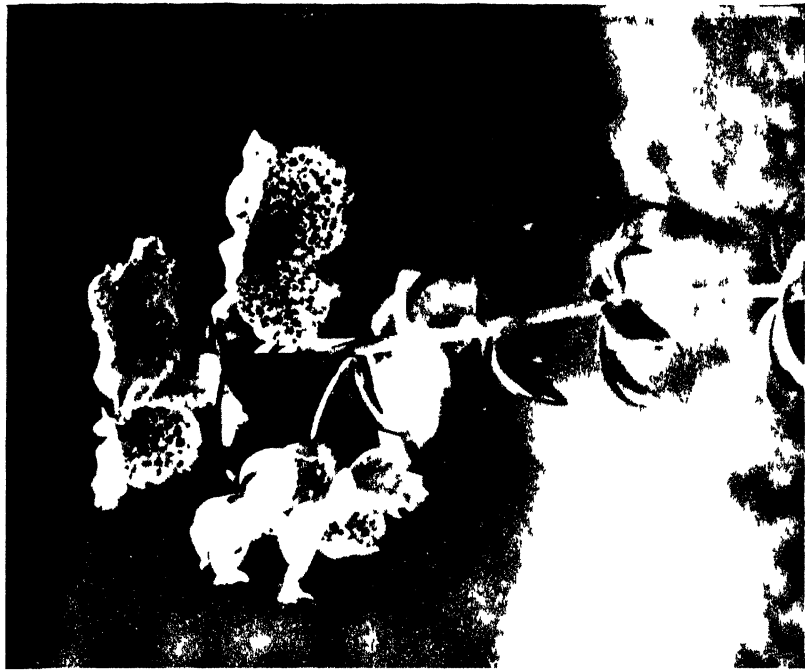


Fig. 131—*Nomocharis Mairei* in Mr F. C. Wood's garden at Durrington, Sussex (See p. 331)



Fig. 132—Symptoms of Bulb and Stem Eelworm Attack on:
 A Hyacinth; B, C Narcissus; D Oenothera; E Saxifrage (See pp. 337-8)



Fig. 133—Symptoms of Bulb and Stem Eelworm Attack on.
 F, G Phlox, H Primula; I Onion; J Potato (See p. 338)



YUCCAS OF THE SOUTH-WESTERN U S A

Fig 134—*Yucca elata* Engelm., reproduced by kind permission of the author from SUSAN D. MCKILVEY's Monograph on *Yuccas of the South-Western United States* (See p. 359)



YUCCAS OF THE SOUTH-WESTERN U.S.A

Fig. 135—*Yucca Whipplei* Torrey

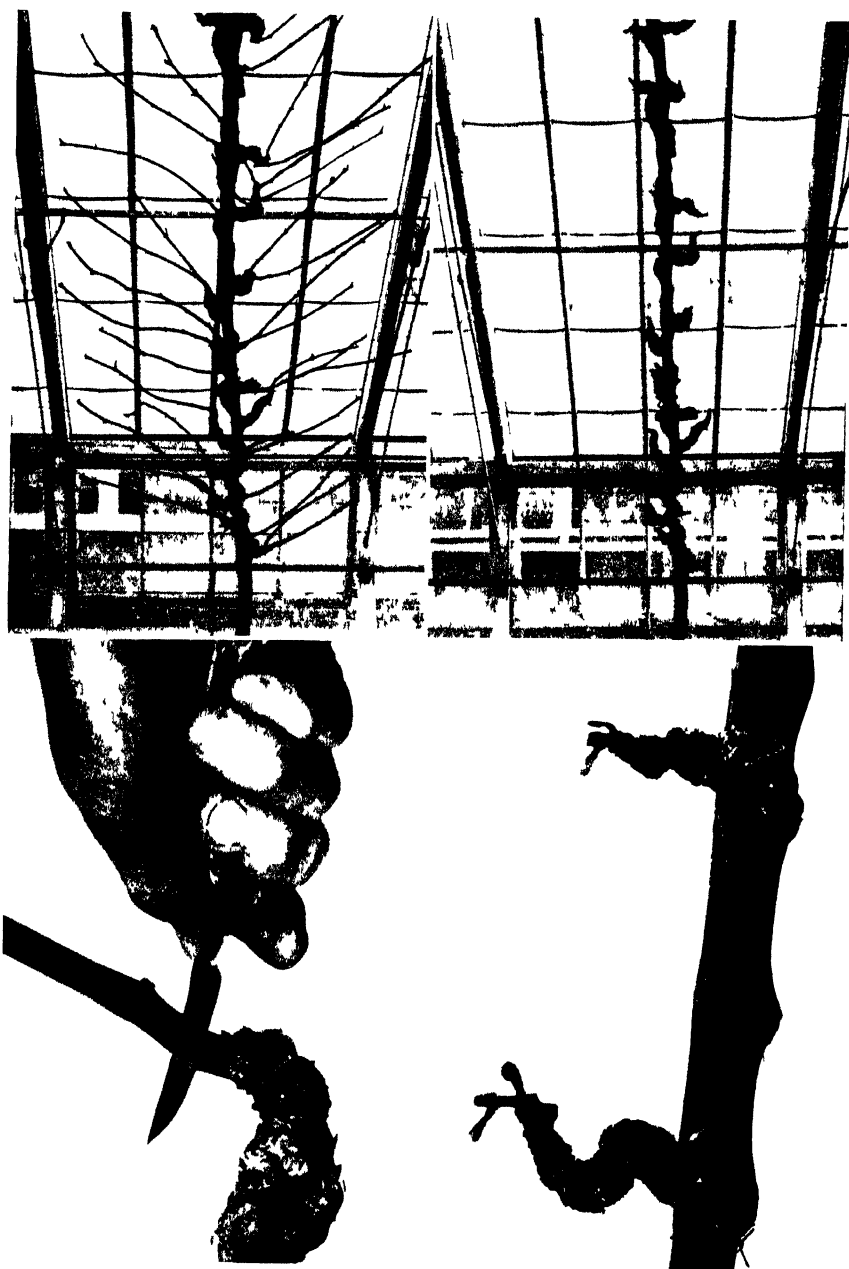


YUCCAS OF THE SOUTH-WESTERN U.S.A

FIG 136--*Yucca elata* Engelm.



Fig 137—*Histaria venusta* (See p 332)
F C C May 4 1946



GRAPE GROWING IN COLD HOUSES

Fig. 138—Top photographs and bottom left—Winter pruning of lateral growths
Bottom right shows vine after disbudding has taken place (See p. 350)

Biologic Races. The existence of biologic races or strains of the Bulb and Stem Eelworm has been recognized for many years, and the subject has been reviewed in this country by GOODEY (13, 15, 21), HODSON (22, 24), FOX WILSON (9), and others.

These races are identical one with another so far as their morphological characters are concerned, and each race has its own peculiar behaviour practices in the choice and range of its host plants. There is sufficient evidence to show the existence of (i) highly specialized races capable of living on one or two hosts only, (ii) somewhat specialized races able to attack several hosts, and (iii) unspecialized races capable of infecting several and often dissimilar host plants.

TABLE II

The Host Range of (I) a Rather Specialized, and (II) a Somewhat Unspecialized Biologic Race of the Bulb and Stem Eelworm, *A. dipsaci*.

(I) <i>Narcissus</i> (<i>Amaryllidaceae</i>)	Bluebell, <i>Scilla nonscripta</i>	(<i>Liliaceae</i>)
	Onion, <i>Allium Cepa</i>	"
	Parsnip, <i>Pastinaca sativa</i>	(<i>Umbelliferae</i>)
(II) <i>Phlox paniculata</i> , Herbaceous Phlox (<i>Polemoniaceae</i>)	<i>Collomia coccinea</i>	(<i>Polemoniaceae</i>)
	<i>Gilia coronopifolia</i>	"
	<i>G. minima</i>	"
	<i>Phlox divaricata</i>	"
	<i>P. Drummondii</i>	"
	<i>P. D. cuspidata</i>	"
	<i>P. D. nana compacta</i>	"
	<i>Oenothera fruticosa Youngii</i>	(<i>Onagraceae</i>)
	<i>O. f. Major</i>	"
	<i>O. glauca Fraseri</i>	"

Two examples will suffice to indicate the host range at Wisley of two strains, namely, (I) a *Narcissus* race (Table II, and Fig. 185, R.H.S. JOURNAL, 71, Part 11, Nov. 1946); and (II) a *Phlox* race (Table II).

The theory concerning the existence of biologic races is, according to GOODEY, that they represent adaptations, such that, the longer a parasite attacks a particular host the higher the degree of specialization to it becomes and the less it is able to attack other plants.

Several workers, both in this country (GOODEY (1923 *et seq.*); EDWARDS (4, 5); HODSON (*loc. cit.*); JOHNSON (28, 29, 30)), on the Continent (RITZEMA, BOS and QUANJER), in the United States (GODFREY, KREIS and STEINER), and elsewhere, have investigated the host range of certain known races of *A. dipsaci*.

Some, though not all, strains are reciprocally infective. Reciprocal infection does not appear, however, to be a constant factor and the behaviour of any strain is dependent, at least in part, upon its ancestral history.

Investigations into the host range of biologic races of eelworms are of paramount importance to the agriculturist and horticulturist. The knowledge gained as to the behaviour practices of highly, of somewhat specialized, and of unspecialized races will allow the grower to avoid attacks on crops grown subsequently on infected land by withholding those crops that come within the host range of the race or races present

in the soil. Every grower should keep a crop history of the land under cultivation for, armed with this knowledge, a crop rotational plan may be drawn up without the disastrous results that frequently follow the planting-up of Eelworm-infected land.

The important role that weeds play in serving as reservoir hosts on which the eelworms can live in the absence of a susceptible farm or garden crop has been fully discussed by GOODEY (1933 *et seq.*), HODSON (23), JOHNSON (28, 30), and others. Observations on weed hosts of *A. dipsaci* are important, as they suggest a possible answer to the problem of the persistence of infection where a particular crop has been absent, through rotation, for some years (15). Certain races of the parasite are capable of maintaining themselves on weeds (e.g. Cleavers and Chickweed), and this will on many occasions account for the sudden appearance of an attack on a susceptible crop when next it comes in the rotation.

The ability of the pre-adult larvae to survive in a desiccated form for long periods has already been discussed, but their survival in moist soil in the absence of some host for a year or more is unlikely (12a), and other sources of food—in this case weeds—would account for the persistence of the pest in fields and elsewhere where a 4 to 5 years' crop rotation system is practised.

The sporadic outbreaks of *A. dipsaci* that occur from time to time on crops, especially on those grown in freshly converted pasture and grassland, are due either to seed-borne infections as in Onions (19, 34), or to the existence in the soil of a biologic race capable of transferring from some Gramineaceous weed to cultivated plants.

Means of Dispersal. There are several ways by which microscopic eelworms can spread to fresh sites, the chief being by (i) actual migration in the soil, and (ii) mechanical means, including carriage in and on plants, soil, manure, and by wind and water.

Some of the principal means of dispersal of eelworms are outlined—the numbers referring to those in Diagram 1, page 341.

- (A) *Seed transmission*—in, e.g. Cat's Ear (*Hypochaeris radicata*) or on, e.g. Onion, seed (1).
- (B) *Plant transmission*—in and on bulbs, e.g. Narcissus, (2), Hyacinth, Scilla and Tulip; and tubers, e.g. Potato (3). In cuttings, e.g. Phlox (4).
- (C) *Carried in soil* attached to garden tools (5), tyres of barrows (6) and carts; unsterilized plant pots (7), support-stakes (8) and canes; and boots (10) and animal hooves; in plant debris among returnable market flower-boxes and crates (9).
- (D) *Compost and manure heaps* where eelworm-diseased plants and parts of plants have been thrown without correct preparation of the heap to ensure that a sufficiently high temperature is maintained throughout the heap to destroy the eelworms (11).
- (E) *Carriage in surface drainage water* on sloping ground, by irrigation, and by floods (12).

Furthermore, high winds may carry the desiccated, pre-adult larvae in soil particles or in dried leaves of infected Narcissus (1).

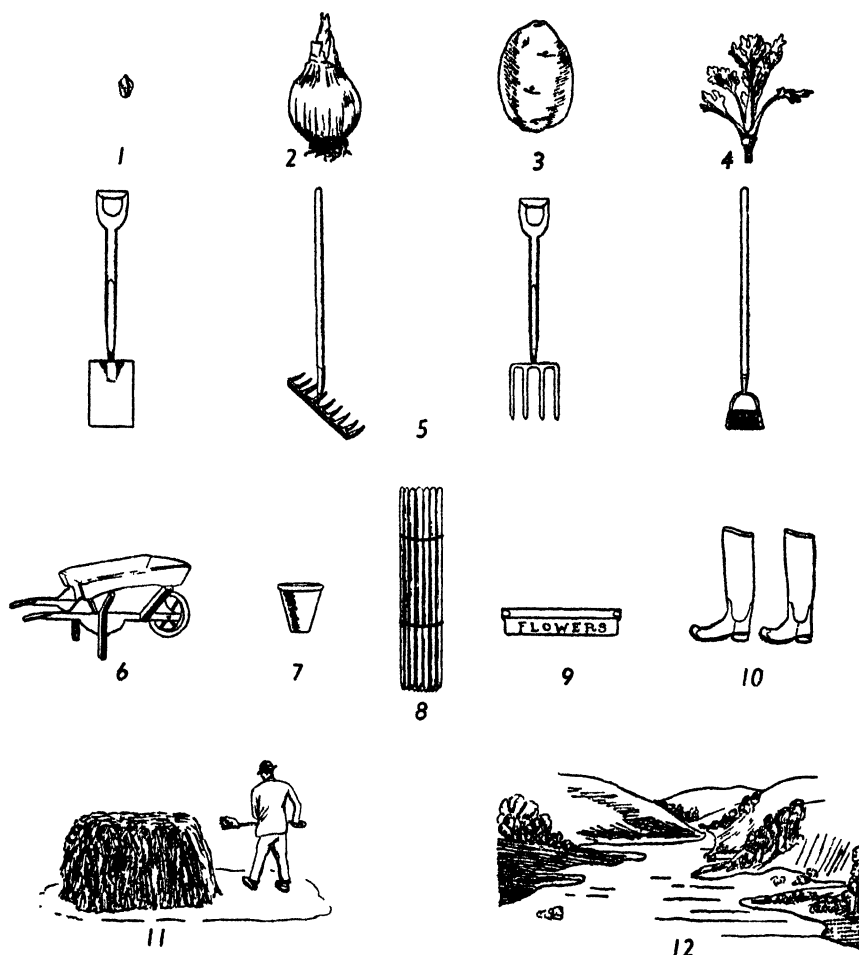


DIAGRAM 1—Some means of dispersal of Eelworms. (See p. 340)

Control Measures. Methods of control against Eelworms, and the Bulb and Stem Eelworm in particular, may be considered under the following headings, namely, (A) Indirect, including (1) Cultural Methods; and (B) Direct, including (2) Physical and (3) Chemical Methods.

(1) *Cultural Methods* are chiefly concerned with operational practices to avoid eelworm outbreaks.

(i) *Rotation.* The manurial benefits accruing from crop rotation are well known, and the system should be practised in the smallest garden so far as possible as a means of reducing the incidence of eelworm attack. The distance that can be arranged, however, in small gardens and allotments between the site of the previous and the current years' crops is often negligible, and eelworm avoidance in such areas may prove a difficult problem.

Eelworm attack is largely avoided by rotation provided that a crop, which is subject to infection by a particular biologic race, is withheld

from the infected border or bed for a period of at least three years. For instance, a border that is known to be infected with the *Narcissus* strain of *A. dipsaci* should be kept free from Bluebells, Onions and Parsnips for the specified period (see Table II).

It is desirable to exclude perennial plants from any crop rotation system in infected land in order to avoid the possibility of building-up an eelworm race that may adapt itself over a number of years to the perennial host.

(ii) *Clean Cultivation.* The possibilities of weeds and "ground keepers" (e.g. Potato tubers and *Narcissus* bulbs) as "reservoir" or "bridging hosts" for the particular eelworm race should be borne in mind, and will be considered later. Failure to destroy weeds in eelworm-infected land may defeat the beneficial effects of crop rotation. Observations by GOODEY (21), HODSON (23), JOHNSON (28, 30) and others have shown that many weeds are normal hosts of *A. dipsaci*. In particular, Chickweed (*Stellaria media*), Cleavers (*Galium Aparine*), Cat's Ear (*Hypochaeris radicata*), and Plantains (*Plantago species*) are, together with others, capable of serving as reservoir hosts for certain races, and thus maintaining a population of eelworms from year to year in the absence of a susceptible crop host.

The behaviour of many biologic races is known, and information as to the host range of such may be obtained from Horticultural Research Stations and from members of the National Agricultural Advisory Service throughout the country. A far greater knowledge of the behaviour practices of biologic races of this Eelworm would be gained if growers kept a crop history of the land under their cultivation.

It is advisable to remove and burn all diseased crop remnants from infected land. The task, however, of clearing large areas of *every* bulb or tuber requires considerable effort, but failure to remove "ground-keepers" will result in the persistence of a particular biologic race of eelworm in the soil. In lifting diseased plants, stress is laid again upon the importance of carrying out the operation thoroughly so that no part of the underground stem, bulb, tuber or corm remains in the soil to carry on an infection.

Effective drainage, especially in heavier soils, is necessary to avoid eelworms spreading both in surface drainage and in flood water.

The judicious application of organic and inorganic manures will promote health in plants and, in addition, produce rapid growth and, with higher potash rates, some tolerance to eelworm attack. An excessive amount of nitrogenous manures, however, tends to the production of lush, sappy growth that may mask the effect of eelworm attack. Furthermore, the soft luxuriant shoot growth induced in overmanured herbaceous Phloxes is liable to split during a period of late spring frosts, and thus cause confusion with eelworm infection (Fig. 133 F).

Danger arises from the use of manure and composting material which has been contaminated with diseased plant material. This may be overcome by carefully preparing the compost heap so that the outer portions are turned into the centre of the heap where, provided that periodic dressings of sulphate of ammonia or similar bacterial stimulant are given, the temperature is raised to 120° F. over a period of days.

The utmost care should be taken that soil is not transplanted from an infected border to fresh areas on garden tools, plant stakes, and on the boots of persons walking on the site (Diagram 1).

This eelworm may be introduced on plants, especially seed (Onion), bulbs (Narcissus), and tubers (Potato), and the danger which arises from such sources is stressed. One example of the passive migration of the Bulb and Stem Eelworm will suffice, namely, the presence on Potato "seed" harvested from infected land of small pieces of dried soil, together with desiccated pre-adult larval eelworms, adhering to the tubers (2, 7). These proved, however, to be those of the Potato race, but it is logical to suppose that the Narcissus or some other strain is carried in this way on soil adhering to tubers, bulbs and other underground portions of plants, and are thus unwittingly introduced into land hitherto clear of the pest. It is for this reason that Potato tubers, in particular, should be washed before being placed in "sprouting-trays" to remove any dried soil adhering to them. This washing will ensure the removal of desiccated Bulb and Stem Eelworms and of any female cysts of the Potato Root Eelworm, *Heterodera rostochiensis*.

(iii) *Vegetative Propagation.* The danger from seed transmission of *A. dipsaci* is very real, and the potentialities of the parasite being seedborne require further investigation. Sufficient is known, however, that the parasite may occur in the panicles of Oats; within the seed-coat of certain Composites, e.g. Cat's Ear (*Hypochaeris radicata*); on the walls of the seed-capsules and in dry debris which accompany the seed in the roughly threshed condition on Onion (34); and in seed-capsules of Narcissus and Primula. It is, therefore, essential to harvest seed only from clean eelworm-free plants.

Propagation either by stem cuttings or by division of diseased plants in the case of herbaceous subjects (Oenothera and Phlox) is manifestly unwise and should be rigidly avoided (8).

A clean stock of Phloxes may be raised from root cuttings taken from diseased plants provided that true root cuttings are taken. Failure to differentiate between a true root and that portion of the stem that is below ground is the reason for failing to raise clean stocks from root cuttings. The roots should be thoroughly washed free from soil inserted as cuttings in clean, sterilized compost, and the resultant plants placed in a fresh site (8).

3. *Physical Methods.* The chief physical means for destroying plant-parasitic eelworms is by employing heat in the form of (i) steam sterilization of glasshouse soils and potting composts, of plant pots, support-canes, etc.; and (ii) warm-water sterilizing baths for immersing Phlox stools, Narcissus bulbs, and Strawberry runners for periods ranging from 20 to 180 minutes at a constant temperature of 110° F.

Steam sterilization of soil has long been practised in this country for the destruction of various disease (bacterial and fungal) and pest organisms (eelworms and various soil pests, including Millepedes, Mites and Insects), and weed seeds.

The practical aspects of the process, together with various methods of carrying out the operation and the respective costs have been fully discussed by BEWLEY (*Ministry of Agriculture's Bulletin No. 22*, entitled

"Practical Soil Sterilization"), and should be consulted by those interested in the subject.

Warm-water sterilization of the living plant has developed in recent years, and is now extensively applied for the control of the Bulb and Stem Eelworm, the Chrysanthemum, and the Fern Eelworms in infected bulbs and dormant plants. The work of RAMSBOTTOM (33) led to the standard treatment of Narcissus bulbs for three hours in water maintained at 110° F. It was found, later, that dormant Phlox stools are cleared of eelworm disease by their immersion in water at the same temperature for 30–60 minutes (8, 15). Some plants, however, react less favourably to warm-water sterilization, for instance, bulbous Irises, which are somewhat intolerant of the treatment (3, 25), unless due care is taken to sterilize the bulbs at a certain critical period of their development.

The efficacy of the treatment in the case of living plants depends upon the operational technique, and upon the efficiency of the apparatus employed. Improvements have been made in thermostatic control to maintain constant temperatures, while a study of convection currents has eliminated the danger of creating "hot spots" within the containers. The efficiency of warm-water baths for the treatment of Narcissus bulbs has been considered by STANILAND and BARBER (*Ministry of Agriculture's Bulletin No. 105*).

3. *Chemical Methods.* The eradication of eelworms in open ground by chemical means is not yet possible, though a large number of chemical substances have been tested with a view to destroying Nematodes in infected land. Among those tested under glasshouse conditions have been Calcium cyanide, Carbon disulphide, Cresylic acid, Formaldehyde and Phenolic compounds, all of which are either too expensive for field-scale operations or provide only a partial control.

Chemical substitutes for steam are cheaper and more convenient to apply, but none is as yet so effective. Recent investigations have been made with other soil fumigants, including Chloropicrin, Methyl bromide, Ethylene dibromide, DD mixture, and others. The last mentioned compound is named after its two principal constituents, namely, 1,2 Dichloropropane and 1,3 Dichloropropylene, and promising results have been obtained with this chemical against the Root-Knot Eelworm, *Heterodera marioni*. The danger of tainting food crops is a factor, however, that requires careful investigation before its general use is advocated. It is suggested that growers should await the results of critical investigations by competent workers before embarking upon a programme of field fumigation against eelworm pests.

A recent outstanding investigation has been the successful control of *A. dipsaci* on Onion seed with Methyl bromide (20a), whereby the parasites attached to the seeds are killed without any harmful effect upon the vitality of the seed.

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artist, MR. A. J. WISE, for the drawing illustrating the host range of the Bulb Eelworm; and to my wife for the illustration depicting some means of eelworm dispersal.

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GRAPE GROWING IN COLD HOUSES

J. Wilson, A.H., R.H.S.

OWING to present-day conditions and the consequent scarcity of experienced gardeners, many owners of gardens are faced with the problem of managing their own garden, which often includes a glasshouse in which one or more Grape rods are already established.

The existing fuel restrictions make it necessary to grow these Vines without the aid of artificial heat, but by attention to certain details good results are possible under these conditions, especially in the case of the variety 'Black Hamburg' and a few other suitable varieties.

Undoubtedly there are a great number of Vines growing in unheated glasshouses that never give of their best, largely the result of neglect or errors in cultivation. It is hoped that the information given in this article will be of some assistance to those with limited experience. It is considered that the best mode of presenting this information is a detailed account of the Vine's needs during each month of the year.

It is assumed that the Vines are well established and requirements regarding ample rooting medium have been met.

JANUARY

Begin well in the New Year by having both house and Vines thoroughly cleaned; if for any reason the house has not been washed and the borders top-dressed no time should be lost in carrying out these operations (see December notes). Provide maximum ventilation in order to keep the buds as dormant as possible.

FEBRUARY

A start can now be made to maintain a slightly higher temperature, but the ventilators should be opened when this approaches 45° F. The buds will benefit from a light syringing with tepid water provided that this is carried out on sunny days only, not later than mid-day; it is important that the house and Vines should be dry by evening. Do not attempt to raise the temperature unduly high at this period in order that young growth should not be too advanced while there is danger of severe frost penetrating to the inside of the house.

MARCH

As the days lengthen it will be safe to raise the temperature to about 50° F. before admitting air. Continue with the syringing of the rods on all favourable occasions. Maintain a moist atmosphere by damping the border, paths and walls; on sunny days this might be necessary twice a day; when the opposite conditions prevail refrain from damping. Aim at promoting humidity on warm days and drier conditions when dull. Prevent patches of dry soil and guard against the opposite extreme.

APRIL

Early in this month the young growths should be about an inch in length and at this stage they should be reduced in number, maintaining for the time being two shoots to each spur; the terminal one is usually the strongest and incidentally produces the best bunch. It is important to retain a fairly strong shoot near to the base of the spur with the object of pruning back to this shoot, thereby keeping the spur short (a desirable condition). Mildew is the common disorder of Grapes growing in unheated houses and in order to prevent this malady dust the young shoots with Green Sulphur immediately these are about 2 to 3 inches in length, using a distributor for this purpose in order to cover every portion of the leaves and rods.

Seasonal weather conditions prevailing, growth will be rapid at this stage, and before the end of the month it will be time to pinch the

young shoots at two to four leaves beyond the bunch, the actual number depending upon the available space between the rods.

MAY

The young shoots will naturally tend to grow towards the glass and if there is sufficient space (12 to 15 inches) between the rods and the roof glass no harm will result, but at this stage steps should be taken to prevent these laterals touching the glass and to bring them gradually down to the wires upon which the rods are tied. This is accomplished by tying raffia at the end of the laterals and straining this to a wire, but only sufficient to keep the point of these from touching the glass. In carrying out this operation there is a danger of the laterals snapping with the consequent loss of a spur, so great care is necessary. From time to time the raffia should be pulled a little tighter until the shoot is finally brought down to the wires and secured with stronger raffia. Towards the end of the month the flowers will open and at this period a fairly high temperature should be maintained, yet at the same time the top ventilator should not be entirely closed either day or night unless an exceptionally cold spell should be encountered.

During this period promote drier atmospheric conditions, especially before mid-day, for the purpose of drying the pollen in order that it is more easily dispersed; the old idea of keeping the house entirely dry during the whole period is not recommended. After pollination has taken place the house should be damped down each day, provided the weather conditions are favourable.

To pollinate, about mid-day draw the hand gently down the bunches, in fact it is a case of allowing these to slip lightly through the hand, which becomes coated with pollen. This operation transfers the pollen from bunch to bunch. Where more than one variety is growing in the same house cross-pollinate these. Extra precautions should be taken in the case of varieties which do not set freely by tapping the rods sharply with the fist about nine o'clock in the morning for the purpose of removing the flower caps and expelling surplus moisture to enable the pollen to dry more quickly.

JUNE

Immediately the berries have set the number of bunches should be reduced, first disposing of the small, misshapen and badly set ones, and in the case of shy setters the best set bunches should be retained rather than the largest. At this stage retain a small surplus over actual requirements, in case of accidents. As soon as it can be seen that the berries are swelling, thinning should commence, using a special pair of scissors for this work. It is advisable to carry out this operation in two stages, first removing all seedless berries and those pointing towards the centre of the bunch. Retain all tip berries as these give form and size to the bunch. Do not remove the lower berries from the shoulders; at a later stage these shoulders can be suspended with raffia from the main bunch and when mature will increase the size of the bunch. There is considerable variation in the bunches of the different varieties; some have long foot stalks to the berry and form a loose bunch while others are

the reverse; varieties like 'Black Hamburg' set freely, but Muscats are often shy setters. In the case of the last mentioned caution is necessary at this stage as it is difficult to discern for certain which berries have been properly fertilized. Generally speaking in a variety like 'Black Hamburg' two berries are cut out to every one retained; on the other hand, 'Muscat of Alexandria' might only require the seedless berries removed at this stage. It is most important that no time be lost in carrying out the first thinning as it is rather tedious work and the berries swell rapidly and by the time the last bunch is reached it will be getting towards the stage when the berries become tight.

When it can be seen that the bunches are developing satisfactorily the few spares should be removed and for the future welfare of the Vine it is most important that overcropping should be avoided. It is difficult to state what constitutes a fair crop as the number of bunches to be retained will depend mainly upon the health of the Vine and size of the bunches. Most Vines produce many more bunches than should be retained and for Vines growing on the single rod system a rough estimate is a bunch for every foot of rod from the basal spur. On a 12 ft. rod this would mean six bunches each side.

At this period maintain a fairly high temperature and a humid atmosphere by damping the border, walls and path as frequently as weather conditions permit. Examine the borders to ascertain water requirements and when water is necessary this should be in sufficient quantity to soak the border thoroughly.

The present is a suitable time to apply some form of nourishment such as Dried Blood or Thompson's Vine manure, or a mulch of farm-yard manure can be applied which besides giving manurial assistance will have the effect of reducing the frequency of watering. A word of warning is necessary with regard to applying manure in this form owing to the likelihood of the fumes burning the foliage; a certain amount of ventilation should be maintained day and night until all danger is past. Should mildew have been troublesome the previous year or if it should suddenly manifest itself repeat the dusting of Green Sulphur.

During the present month growth will be active and the sub-laterals will require periodical attention. Where the laterals almost meet pinch the sub-laterals at one leaf, the object being to furnish the roof glass with a sufficiency of good leaves without overcrowding.

JULY

The berries will swell rapidly until they are about half grown; this is known as the first swelling and when this stage is reached the berries remain more or less at a standstill for about three weeks. During this quiescent stage the stones are forming and this is a critical period and nothing in the nature of excitement or a check should take place. The temperature should not fluctuate; provide the necessary ventilation without lowering the temperature unduly. Do not close the ventilators entirely at any time during this period. After the berries have "stoned" they swell rapidly to their full size, and before this takes place the bunches should be examined with a view to removing any surplus berries which may still exist. During this thinning suspend the shoulders with raffia

to a wire or lateral in order that the berries can swell to the maximum. Damping and the attention to the sub-laterals should be carried out in the same manner as advised for June.

The berries of the variety, 'Madresfield Court,' are prone to split when colouring and from this stage the sub-laterals should be allowed to develop at will; this has the effect of minimising the splitting to some extent.

Immediately it can be seen that the berries are taking on their second swelling the temperature can be increased by closing the ventilators fairly early, provided this is accompanied by copious dampings.

Exercise care in ventilating the house in order to reduce the possibilities of "scalding" the berries. At this period it is necessary for the ventilators to be opened slightly before the sun shines on the house in the morning. As a precaution it is advisable to open the top ventilator before nightfall in order to reduce condensation. A light shading of the roof glass is often necessary at this stage.

The present is a good time to apply a second feed either in the form of liquid manure or one of the approved Vine fertilisers.

AUGUST

In an average season the berries of the variety 'Black Hamburg' growing in unheated houses usually show signs of colouring early this month.

Towards the end of the month when the berries are approaching maturity gradually reduce the amount of atmospheric moisture, especially towards nightfall, and a current of air should be maintained both day and night. White Grapes are improved by exposure to sunlight during the ripening process; this is attained by tying back a few leaves from the bunches.

SEPTEMBER

Early in the month the Grapes should be ripe and when the bunches must remain on the rods for some considerable time steps should be taken to maintain a free circulation of air and reduce damping to a minimum; the roots should never be allowed to become dry at any period. Choose sunny weather to carry out the necessary watering. Make a point of examining the bunches at least once a week for the purpose of removing any rotting berries which may appear.

OCTOBER

Where the bunches are still hanging refrain from damping the borders from now onwards. The fruit should be disposed of as soon as possible as the berries are liable to rot in a low temperature. As long as the bunches remain on the Vine continue to inspect them frequently and cut out decaying berries to prevent wholesale rotting. As far as possible maintain a minimum temperature of about 50° F., and by careful ventilation promote a good circulation of air.

NOVEMBER

The bunches should be removed by this date and maximum ventilation both day and night should be given in order to rest the Vines. Remove

all sub-lateral growth with the object of affording maximum light and air to the laterals, enabling them to become thoroughly ripened. Do not prune until the leaves have fallen.

DECEMBER

Prune immediately the leaves have fallen in order to reduce the risk of bleeding, cutting the lateral back to two buds and where extensions exist shorten these according to strength and requirements. Where Mealy Bug has been troublesome remove the *loose bark only* before spraying with a 5 per cent. Tar-oil wash. All woodwork should be scrubbed, walls whitewashed, and glass washed both inside and out. After cleaning both house and rods replenish the border soil by removing the top inch and replace this with a top dressing made up of good turfy loam to which some well rotted manure, a little bonemeal and Sulphate of Potash have been added. Maintain the maximum ventilation.

VARIETIES

Undoubtedly the most reliable variety for growing under these conditions is 'Black Hamburgh'; unfortunately the well-known 'Muscat of Alexandria' is not to be generally recommended, although a certain measure of success is obtained in favourable seasons such as the one experienced in 1947. Where a White Grape is desired the variety 'Foster's Seedling' is recommended, being a good grower of fair flavour. 'Ascot Citronelle' (amber), 'White Frontignan,' 'Grizzly Frontignan' and 'Royal Muscadine' are all varieties of good flavour which should succeed in a cold house.

PESTS AND DISEASES

Mealy Bug was a most serious pest of the Grape and most difficult to control until the introduction of Tar-oil washes. When applying this wash it is of the utmost importance that the buds be in a dormant condition, and if applied thoroughly at the correct strength it should be most effective. Mealy Bug is often introduced by placing host plants in theinery and should this pest appear on the Vines during the growing season partial control can be obtained by dabbing the bugs with methylated spirit applied with a soft brush. Small wads of cotton-wool tied round the stalks of the bunches will usually prevent the bugs from invading these.

Red Spider seldom makes its appearance on Vines in cold houses provided the roots receive sufficient water and correct atmospheric conditions are maintained.

Mildew can be very serious under these conditions, especially if cultivation is at fault, or should the season prove wet and cold. In this instance prevention is better than cure and it is of the utmost importance that the sulphur dustings be applied as recommended during April with a second application when the berries have set, should this be thought necessary.

Shanking is not exactly a disease but a condition, which is probably brought about by one, or a combination, of cultivation errors. At the first stage of ripening odd berries or small groups of berries fail to

colour and develop naturally—these are watery and sour, also the berry stalks shrivel. This is undoubtedly the result of an unhealthy condition of the roots such as might be brought about by these penetrating stagnant soil. Overcropping of the Vines which puts an undue strain upon the rooting system is considered to be another cause. The remedy is to examine the roots and correct defects, at the same time reducing the crop for a year or two until the Vine has gathered strength.

VENTILATION

A glasshouse used for Grape growing might be (a) span, (b) three-quarter span, or (c) lean-to. All should have ventilators at the top and at some point near the ground either as part of the glasswork or as a movable shutter in the brickwork near the ground. A span house usually has the ventilators arranged on both sides, top and bottom, a three-quarter span might have them either on one or both sides at the top but on only one side at the bottom, whereas the lean-to house at least has a top ventilator and often has one at the bottom also. The reason for ventilators is to control the temperature inside the house and this is more difficult in the early spring when the weather is fickle and the young growth tender. As the season advances and the weather becomes more settled and the foliage fully grown, the manipulation of the ventilators is less difficult and when the fruit is gathered they can be opened to the maximum both day and night as even a certain amount of frost will not harm the Vines, in fact it can be beneficial.

Starting in February when the temperature should be controlled the ventilators are brought into play for this purpose. Commencing in the early morning with the ventilators closed the temperature of the unheated house will be some degrees warmer than that ruling outside, but as soon as the sun reaches the house it naturally begins to raise the temperature inside and when a certain temperature is reached (this varies according to the stage of growth) a start should be made to open a top ventilator, not for the purpose of lowering the temperature but rather to prevent it from rising unduly high. As the sun gains power the ventilation is increased until the maximum is reached, should the increasing warmth of the sun demand it. Early in the season the sun might not have sufficient power to cause the maximum amount of ventilation to be used, or again a prevailing cold wind will temper the sun heat, but whatever the outside conditions are the temperature of the house should rise progressively with the day until the maximum is reached, usually between twelve and one o'clock G.M.T.

After the maximum outside temperature has been reached and begins to fall naturally so should the ventilators be gradually lowered until they are completely closed (except during the periods mentioned in the cultural notes), a little ahead of the sun departing from the house, the reason for this being to husband a certain amount of sun heat to maintain a comfortable temperature as long as possible into the night.

As the season advances and the power of the sun increases the mean temperature will naturally increase and if the ventilators have been opened to their maximum there is then very little danger even if the temperature in the house rises to a considerable height.

The foregoing is the principle upon which ventilators are used for the purpose of regulating the temperature inside the house, which is very necessary during the early part of the growing season. It is of the utmost importance that the ventilators should not remain closed to force the temperature to rise unduly high, which will cause scorching of the foliage or scalding of the berries. It is better to err on the cool side rather than risk these conditions. Should it be difficult to give the necessary ventilation early enough it is advisable to leave a top ventilator slightly open all night to act as a safety valve.

Where both top and bottom ventilators exist the principle to work upon is to use the top ones first before bringing the bottom ones into play, in fact it is seldom necessary to use the last mentioned until well on in the season, except at the time of flowering.

Should a cold wind prevail apply the ventilation on the leeward side of the house, in fact sometimes it is necessary to use both top and bottom ventilators on the opposite side to the prevailing wind as it is most important to avoid anything in the nature of a draught. Periods when it is advised to retain all night ventilation during the growing season are outlined in the notes dealing with cultivation.

WATERING

Many people fail to grasp the principles of watering, especially when dealing with Vines growing in an open border. The common mistake is failing to give sufficient water during the growing season, also in thinking that watering should cease once the crop has been gathered. The frequency of watering depends upon the time of the year; naturally more water will be required when the roots are active, yet at the same time the soil should never be allowed to become dry during the dormant season. During active growth watering might be necessary, say, once a fortnight, yet once in six or eight weeks might suffice during the winter; these are approximations. Always give sufficient water to wet the border thoroughly.

DAMPING

Only during the growing season is it necessary to maintain a moist atmosphere, which is obtained by damping the border, walls and paths with water applied through a watering can with a rose attached. As already explained in the notes dealing with cultivation, the frequency and density depend upon the prevailing weather and temperature; during hot and sunny periods it might mean damping once, twice or even three times a day, yet when the opposite conditions prevail damping is not advisable. Between the ripening of the fruit and the commencement of a new growing season damping is not necessary. Guard against the border soil becoming pasty by over-damping and the other extreme by allowing dry patches to form under the stages and behind any existing hot water pipes. Never confuse watering and damping; it is easy to apply too much water in the case of damping and too little when watering.

PLANTS TO WHICH AWARDS HAVE BEEN MADE IN 1948

Camellia japonica 'Mercury' A.M. April 6, 1948. A very large-flowered and attractively coloured variety. The flower, 4 inches in diameter, is composed of from sixteen to twenty spreading and slightly recurved orbicular petals nearly 2 inches long, of a soft crimson hue (H.C.C. 22) with slightly darker veins. The elliptic, dark green, glossy leaf is 4 inches long. Exhibited by E. de Rothschild, Esq., Exbury, Southampton. (See p. lix.)

Chaenomeles lagenaria 'Knap Hill Radlance.' A.M. April 6, 1948. An unusually good variety of the Japanese Quince, popularly called 'Japonica.' The flower when fully open measures 2 inches across, and has five broad-ovate petals of Geranium Lake (H.C.C. 20). Exhibited by Knap Hill Nursery Ltd., Woking. (See p. lix.)

Doronicum cordifolium A.M. April 6, 1948. This plant is an almost perfect miniature of the well-known Doronicums, often grown in the herbaceous border. In the pan exhibited the plants were 2 inches in height each terminated by a large, yellow, daisy-like flower, 2 inches across, with a central boss of golden yellow stamens. The basal cordate leaves are about 1 inch long and $\frac{1}{2}$ inch wide on $\frac{1}{2}$ inch petioles; the cauline leaves sessile, slightly smaller and generally with a developing flower bud in the axil. The whole plant is covered with scattered silver-grey hairs, which form a denser covering on the underside of the leaves. Exhibited by Messrs. W. E. Th. Ingwersen Ltd., Birch Farm Nurseries, Gravetye, East Grinstead, Sussex. (See p. lxii.)

Iphæion uniflorum A.M. April 6, 1948. A small bulbous plant, whose generic position has long been extremely uncertain, and which in consequence has borne a succession of names, the most familiar being, perhaps, *Milla uniflora* and *Triteleia uniflora*. The bulb produces several linear, bright green leaves about 10 inches long and rather shorter single-flowered scapes. The perianth is tubular below, with six flat-spreading, elliptic, light Goutian-blue (H.C.C. 42/3) lobes $\frac{3}{4}$ inch long marked with dark median lines. It is an admirable plant for the front of a sunny border, where it spreads and flowers freely. Exhibited by the Director, R.H.S. Gardens, Wisley, and W. T. Stearn, Esq., 217 Mortlake Road, Kew. (See p. lix.)

Magnolia Kobus var. borealis A.M. April 6, 1948. A Japanese tree of pyramidal form, reaching a height of 40 feet or more. It has obovate leaves 4 or 5 inches long, and creamy-white flowers about 4 inches across, made up of six narrow-obovate petals and three small, lanceolate sepals. Unlike the type *M. Kobus*, this variety does not flower as a young tree. Exhibited by Sir Henry Price, Wakehurst Place, Ardingly, Sussex. (See p. lix.)

Magnolia Sprengerii diva Wakehurst Seedling A.M. April 6, 1948. This plant is a sister seedling of the plant which received the A.M. when shown by Lord Aberconway on April 29, 1947. It differs from the Bodnant plant in the deeper colour of the flower, which is goblet-shaped with ten or twelve obovate petals 4 inches long narrowed above the base, Phlox Pink (H.C.C. 625/3) within, Solferino Purple (H.C.C. 26/3) externally. Exhibited by Sir Henry Price, Wakehurst Place, Ardingly, Sussex. (See p. lix.)

Muscari armeniacum ramosum. A.M. April 20, 1948. This remarkable monstrous form of *Muscari armeniacum* was figured by Parkinson three centuries ago as *Hyacinthus Botroides ramosus*. It has a stout branched scape with from thirty to forty short, deflexed branches bearing irregular clusters of small tubular flowers with fleshy, coloured bracts. The colour approaches Lobelia Blue (H.C.C. 41 to 41/1). Exhibited by Messrs. R. Wallace & Co., Tunbridge Wells. (See p. lxiv.)

Narcissus 'Bahram' A.M. April 6, 1948. As a variety for exhibition. A striking large-flowered *Incomparabilis* variety (Division 2a) with a flower $4\frac{3}{8}$ inches in diameter borne on a stout 20-inch stem. The Mimosa-yellow (H.C.C. 602) perianth segments were rounded, smooth and overlapping, the outer ones being 2 inches long and $1\frac{7}{8}$ inches broad. The neat, cup-shaped corona, which was of solid Marigold-orange (H.C.C. 11), was $1\frac{3}{8}$ inch long and $1\frac{3}{8}$ inches across at its indented margin. Raised and shown by Mr. J. L. Richardson. (See p. lx.)

Narcissus 'Ceylon' F.C.C. April 6, 1948. As a variety for exhibition. This brilliantly coloured 'red-and-yellow' *Incomparabilis* variety (Division 2a) received an A.M. on March 26, 1946. (See JOURNAL 71, 205.) Raised and shown by Mr. J. L. Richardson. (See p. lx.)

Narcissus 'Charity May' A.M. April 6, 1948. As a variety for exhibition. A large-flowered *cyclamineus* hybrid (Division 6) with 14-inch stems, raised by crossing *N. cyclamineus* and *N. 'Mitylene'*. The smooth pale canary-yellow perianth segments were reflexed as in *cyclamineus*, the outer ones being $1\frac{1}{2}$ inches long and $1\frac{1}{8}$ inches in width. The canary-yellow (H.C.C. 2/1) corona was $1\frac{1}{8}$ inches long and slightly more in diameter at its frilled and expanded mouth. Raised and shown by C. F. Coleman, Esq., Broomhill, Cranbrook, Kent. (See p. lx.)

Narcissus 'Dutch Master,' A.M. February 17, as a variety for cultivation in pots, pans or bowls. Shown by Messrs. G. Zandbergen-Terwegen, Sassenheim, Holland. (See p. li.)

Narcissus 'Farewell' A.M. April 6, 1948. As a variety for exhibition. A refined giant Leedsii variety (Division 4a), with a flower $4\frac{3}{8}$ inches in diameter, well poised on a strong 20-inch stem. The white perianth segments were rounded, smooth and overlapping, the outer ones being $1\frac{7}{8}$ inches long and $1\frac{3}{8}$ inches broad. The neat, funnel-shaped, pale sulphur-yellow (H.C.C. 1/3) corona was $1\frac{1}{4}$ inches long and $1\frac{1}{2}$ inches in diameter at its lightly frilled and slightly expanded mouth. Raised and shown by M. P. Williams, Esq., M.B.E., Lanarth, St. Keverne, Cornwall. (See p. lx.)

Narcissus 'Freia' A.M. April 6, 1948. As a variety for exhibition. A refined bicolor *Incomparabilis* variety (Division 2b) with a flower $4\frac{1}{8}$ inches in diameter, well poised on a stout 17-inch stem. The white perianth segments were rounded, smooth and overlapping, the outer ones being $1\frac{5}{8}$ inches long and about as broad. The neat, canary-yellow (H.C.C. 2/1), funnel-shaped corona was $1\frac{5}{8}$ inches long and $1\frac{1}{2}$ inches broad at the mouth. Raised and shown by Norman F. Lock, Esq., F.R.C.S., 5 Barnfield Crescent, Exeter. (See p. lx.)

Narcissus 'Galway' F.C.C. April 6, 1948. As a variety for

exhibition. This refined yellow *Incomparabilis* variety (Division 2a) received an A.M. on April 14, 1942. (See JOURNAL 68, 277.) Raised and shown by Mr. J. L. Richardson. (See p. lx.)

Narcissus 'Jenny' A.M. April 6, 1948. As a variety for exhibition. A large-flowered *cyclamineus* hybrid (Division 6) raised by crossing *N. cyclamineus* and *N. 'Mitylene'*, with stems 12 to 13 inches long. The smooth white perianth segments were reflexed as in *N. cyclamineus*, the outer ones being $1\frac{1}{8}$ inches long and 1 inch broad. The cylindrical corona was very pale Primrose-yellow (H.C.C. 601/3), about $1\frac{1}{4}$ inches long and $\frac{1}{8}$ inch in diameter at the indented and slightly expanded mouth. Raised and shown by C. F. Coleman, Esq. (See p. lx.)

Narcissus 'Killaloe' A.M. April 13, 1948. As a variety for exhibition. A large-flowered, white, giant Leedsii variety (Division 4a) with a flower $4\frac{1}{8}$ inches in diameter, borne with a slightly downward pose on a 15-inch to 17-inch stem. The perianth segments were broad, smooth and overlapping, the outer ones being 2 inches long and about as broad. The rather spreading corona was $1\frac{1}{8}$ inches long and $2\frac{1}{4}$ inches in diameter at its deeply indented, slightly reflexed and expanded mouth. This variety, which received a P.C. on April 16, 1940, was raised and shown by Mr. J. L. Richardson. (See p. lxii.)

Narcissus 'Kilmorna' A.M. April 6, 1948. As a variety for exhibition. A giant Leedsii variety (Division 4a) with a flower $4\frac{1}{4}$ inches in diameter, well poised on an 18-inch stem. The white perianth segments were smooth, rounded and overlapping, the outer ones being $1\frac{3}{8}$ inches long and slightly more in width. The funnel-shaped corona, which was pale sulphur-yellow (H.C.C. 1/3) and slightly paler within, was $1\frac{3}{16}$ inches long and $1\frac{9}{16}$ inches in diameter at its frilled and slightly reflexed margin. Raised and shown by Mr. J. L. Richardson. (See p. lx.)

Narcissus 'Nairobi' A.M. April 20, 1948. A variety for exhibition. A bicolor *Incomparabilis* variety (Division 2b) with a flower 4 inches in diameter, well poised on a stout 20-inch stem. The white perianth segments were rounded, smooth and overlapping, the outer ones being $1\frac{1}{8}$ inches long and $1\frac{3}{8}$ inches broad. The brilliant Marigold-orange (H.C.C. 11), pleated cup was $\frac{3}{4}$ inch long and $1\frac{1}{8}$ inches in diameter at its indented margin. Raised and shown by Mr. J. L. Richardson. (See p. lxv.)

Narcissus 'Preamble' A.M. April 13, 1948. As a variety for exhibition. A large, bicolor trumpet variety (Division 1c) with a flower nearly $4\frac{1}{4}$ inches in diameter, carried with a slightly downward pose on a stout 17-inch stem. The white perianth segments were broad, smooth and overlapping, the outer ones being $1\frac{1}{8}$ inches long and about as broad. The shapely, rather cylindrical canary-yellow (H.C.C. 2/2) trumpet was $1\frac{1}{8}$ inches long and $1\frac{3}{8}$ inches in diameter at its slightly indented and reflexed margin. Raised and shown by Mr. Guy L. Wilson. (See p. lxii.)

Narcissus 'Spellbinder' A.M. April 13, 1948. As a variety for exhibition. A large yellow trumpet variety (Division 1a) with a flower $4\frac{1}{4}$ inches in diameter, well poised on a stout 18-inch stem. The perianth

segments were broad, smooth and overlapping, the inner ones having an attractive windmill-like twist. In colour they were sulphur-yellow (H.C.C. 1/2) passing to the paler tone at their bases. The outer ones were $1\frac{1}{2}$ inches long and $1\frac{3}{8}$ inches broad. The trumpet, which was sulphur-yellow (H.C.C. 1/2) outside, and of the paler tone inside, was just over 2 inches long, and $2\frac{1}{8}$ inches in diameter at its reflexed margin, which was deeply and irregularly indented. Raised and shown by Mr. Guy L. Wilson. (See p. lxii.)

***Prunus avium grandiflora* A.M.** April 20, 1948. The double white Gean, *Prunus avium plena*, has already received the **A.G.M.**, and is one of the most lovely flowering cherries. The present form is similar, and has flowers $1\frac{1}{2}$ inch across, made up of about forty obovate-elliptic petals, with a pair of small green, leafy carpels in the centre. Exhibited by Messrs. John Waterer, Sons & Crisp, Ltd., Bagshot. (See p. lxiv.)

***Rhododendron 'Bartia'* (*R. Barclayi* × *R. 'Portia'* F.C.C.) A.M.** April 6, 1948. A fine Turkey Red (H.C.C. 721/1) hybrid with waxy blooms of good texture and solid colour. Flowers funnel shaped $3\frac{1}{2}$ inches across, $2\frac{3}{4}$ inches long, 5-lobed. Truss dome-shaped containing 12 flowers; leaves $5\frac{1}{2}$ inches long, elliptic, acute, bright green above, paler beneath, smooth and hairless. Raised and exhibited by Lord Aberconway, C.B.E., V.M.H., Bodnant, N. Wales. (See p. lxi.)

***Rhododendron 'Calstocker' var. 'Exbury'* (*R. calophytum* × *R. 'Dr. Stocker'*) A.M.** April 20, 1948. A hardy flowering shrub. Truss dome-shaped, large, containing up to 23 white, bell-shaped flowers, $3\frac{1}{2}$ inches across, 3 inches long, with widely spreading lobes, the base of the tube marked with a maroon blotch on the upper petals. Style deep pink, green tip. The buds are pink, and the flowers are slightly flushed with the same colour, particularly on the outside of the upper petals. Leaves elliptical, about 9 inches long, dark green above, lighter beneath, main veins yellowish-green and impressed. Shown by E. de Rothschild, Esq., Exbury, Southampton. (See p. lxvi.)

***Rhododendron 'Damaris' var. 'Logan'* (*R. 'Dr. Stocker'* × *R. campylocarpum*) A.M.** April 20, 1948. A hardy flowering shrub. Truss dome-shaped, composed of about twelve funnel-shaped Dresden Yellow (H.C.C. 64/3) flowers, 3 inches across and $1\frac{1}{4}$ inches long; style curving, dark pink tipped green, filaments white, anthers brown. Leaves elliptic green above, pale green below, 5 inches long, 2 inches wide. Shown by J. B. Stevenson, Esq., V.M.H., Tower Court, Ascot, Berks. (See p. lxvi.)

***Rhododendron 'Diane'* (parentage unknown) A.M.** April 6, 1948, after trial at Wisley. A hardy free flowering hybrid, with broadly campanulate creamy white flowers, shaded primrose yellow in the centre. Truss compact, generally composed of 9 to 10 flowers each 3 inches across and 2 inches long. Leaves $3\frac{1}{2}$ to 4 inches long, ovate lanceolate, lustrous above, pale green beneath. Sent by Messrs K. Koster & Sons, Ltd., Nurserymen, Boskoop, Holland. (See p. lxi.)

***Rhododendron 'Gladys' var. 'Letty Edwards'* (*R. campylocarpum* × *R. Fortunei*) F.C.C.** April 20, 1938, after trial at Wisley. A hardy flowering shrub. Sent by Messrs. W. C. Slocock, Ltd., Goldsworth

Nurseries, Woking. (This plant is described in the *Rhododendron Year Book*, 1946, p. 71.) (See p. lxvi.)

Rhododendron 'Ibex' (*R. Griersonianum* × *R. pocophorum*) A.M. April 20, 1948. A hardy flowering shrub. Truss dome-shaped containing about ten funnel-shaped, Delft Rose (H.C.C. 020) flowers, $3\frac{1}{2}$ inches across and 2 inches long, with darker spotting on the upper petals, on $1\frac{1}{2}$ -inch long, hairy, peduncles; style and filaments red, anthers black. Leaves elliptic, 6 inches long, $1\frac{3}{4}$ inches wide, dark green above, densely covered with brown felt below. Shown by E. de Rothschild, Esq., Exbury, Southampton. (See p. lxvi.)

Rhododendron 'Kenlis' (*R. Meddianum* × *R. orbiculare*) A.M. May 4, 1948, as a hardy flowering shrub. Truss 10 flowered dome-shaped. Flowers broadly bell-shaped with spreading lobes, 3 inches across and 2 inches long, colour Neyron Rose (H.C.C. 623/3) peduncles pink evenly coloured; anthers brown, style yellow tipped. Leaves broadly oval, 6 inches long and 5 inches wide, dark green above, paler beneath, midrib adpressed yellowish. Shown by the Marquess of Headfort, Kells, Meath. (See p. lxix.)

Rhododendron Loderi var. 'Princess Marina' (*R. 'Loderi King George'* × *R. 'Loderi Sir Edmund'*) A.M. May 4, 1948, as a hardy flowering shrub. Truss large, dome-shaped, 12 flowered. Flowers funnel-shaped, with spreading lobes, large and of good texture, 6 inches across and $3\frac{1}{2}$ inches long; colour palest pink changing to white, often marked with deeper pink patches externally. Filaments white, very short in the upper part of the flower, anthers light brown and arranged in a well-marked ring. Style $2\frac{1}{4}$ inches long, green tipped. Leaves about $8\frac{1}{2}$ inches long, $2\frac{1}{2}$ inches wide, narrowly elliptic, dark green, paler beneath with a yellowish green slightly adpressed midrib. Shown by Sir Giles Loder, Bt., Leonardslee, Horsham, Sussex. (See p. lxix.)

Rhododendron Spinulosum var. 'Exbury' (*R. spinuliferum* × *R. racemosum*) A.M. April 6, 1948. A finely coloured form with scarlet (H.C.C. 19/1), tubular, campanulate flowers, passing to crimson as they age, 1 inch long, $\frac{1}{2}$ inch across. The truss is compound, composed of about 30 flowers which are borne generally in threes from the axils of the upper leaves; the stamens and style are much exerted. The leaves are oblanceolate 3 inches long and $\frac{3}{4}$ inch wide, glossy dark green above, overlaid with bronze in the centre, tips and margins recurved; lower surface pale green, with the main vein brown and scaly. Raised by the late L. de Rothschild, Esq., and exhibited by E. de Rothschild, Esq., Exbury, Southampton. (See p. lxi.)

× **Rhododendron 'Yvonne' var. 'Pride'** (*R. Aurora* × *R. Griffithianum*) A.M. April 20, 1948. A hardy flowering shrub. Truss dome-shaped composed of up to six large funnel-shaped, well spaced, pale pink flowers, which become almost white as they age, 5 inches across, $3\frac{1}{4}$ inches long. Peduncle reddish-brown, 2 inches long; style pale lemon yellow, filaments white. Leaves 7 inches long, elliptic, dark green above, main vein impressed. Shown by E. de Rothschild, Esq., Exbury, Southampton. (See p. lxvi.)

Richardia Rehmanni, Dark Form A.M. April 20, 1948. The

typical pink form of *Richardia Rehmanni* received the A.M. on May 15, 1945, and is described in the JOURNAL, vol. LXX, p. 247. The dark form differs in the colour of the spathe, which approaches *Spiraea Red* (H.C.C. 025/1) suffused with violet on the inside, deepening to violet at the base. The outside is dull brownish-red shaded with purplish-green. The leaves are dark green and unspotted. Exhibited by the Director, R.H.S. Gardens, Wisley. (See p. lxiv.)

Tulipa 'Galata' A.M. April 20, 1948. A handsome hybrid of *Tulipa Fosteriana*, with flowers $4\frac{1}{2}$ inches long, borne on 16-inch stems. The colour was brilliant Capsicum-red (H.C.C. 715) overlaid on the backs of the outer segments with a thin bluish bloom. The insides of the segments were bright Capsicum-red, with a yellow base. Raised by Mr. D. W. Lefeber and shown by Messrs. R. Wallace & Co. (See p. lxxv.)

BOOK NOTES

"Ornamental Cherries." By Collingwood Ingram. 259 pp., 40 pl., 8 col. illus. (London: Country Life Ltd.) 30s. net.

For long there has been a need for a monograph on the Cherries of the Orient. Captain Collingwood Ingram has studied the group for nearly three decades, he has travelled widely in search of them in their native habitats and he has collected and grown a magnificent collection at Benenden. For many years his "Notes on the Japanese Cherries" in this JOURNAL have been the standard reference for this country, and now he has collected together his vast store of experience into a valuable and most readable work.

His book is divided into three parts. The first is a general account of the uses, cultivation, pathology and nomenclature of the Cherries. Perhaps the most interesting of this fascinating part of the book is the chapter on propagation. One is glad to note his plea for working trees at ground level and running up a stem of the scion variety. This has three great advantages; the bark of the stem is of the same texture as the branches (and incidentally is often much more beautiful than that of *Prunus avium*), scion-rooting is encouraged, which is likely to lead to a more vigorous and longer-lived tree, and the unsightly bulge so often seen in high-worked trees is avoided. Of great interest also are the detailed descriptions of his two methods of "top-working" either large saplings of *P. avium* or established ornamental cherries of poor varieties. The first of these, which he calls "spur budding," would seem to hold out promise of wider application.

The second part is a botanical and general description of the wild species and their varieties. To the botanical horticulturist this section will prove of the most interest. The author presents a revised classification of the deciduous cherries, returning, in the main, to Koehne's system. He considers that Rehder's subgenus *Cerasus* is too comprehensive, and suggests a new subgenus, *Lithocerasus* Ingram, to include the Rock and Bush Cherries (e.g. *P. prostrata* Labill. and *P. glandulosa* Thunberg).

A key to the sections and species would have aided identification very greatly. Many, not well-versed in the genus, would have great difficulty in assigning an unknown species to its correct section, and even if successful in this would then in some cases have to work through ten or more descriptions of species or varieties before they could feel certain of an identification. It should involve no very great labour to devise such a key from the very full botanical details recorded.

The descriptions are excellent, but a serious fault in a work of this nature is the incompleteness of the citations of botanical literature in not giving volume or page references, thus adding considerably to the trouble of anyone who may wish to consult the works indicated. As an extreme example, of what use is the reference on p. 166 to "Bull. Acad. Sc. St. Pet." without volume, year or page, when the periodical indicated comprises more than thirty large volumes? (It should read *Bull. Acad. Sci. St. Pétersb.* 29. 107 (1883)). Some of the references are actually erroneous, as, for example, the citation on p. 142 of the imaginary Dutch periodical *Act. Hort. Lugd. Bat.*, 1865, which turns out to be the Russian periodical *Acta Horti Petrop.*, 12. 165 (1892). It is to be hoped that these, together with certain misprints, will be corrected in a later edition.

The third section comprises a description of the horticultural varieties or "Sato Zakura," more commonly, though loosely, known as the Japanese Cherries. It is perhaps disappointing that here again the author has found it impossible to provide a satisfactory key to the varieties, as there are so many plants grown under incorrect names, and a more complete guide to the nomenclature would have been of the greatest value. His descriptions of the varieties, while useful from the horticultural viewpoint, are inadequate for certain identification. He has, however, cleared up certain discrepancies in the nomenclature, as, for instance, the correction of his previous naming of the variety 'Mikuruma-Gaeshi' as 'Temari' (Notes on the Japanese Cherries, 1925 & 1929) and the identity of the widely-grown varieties 'Mount Fuji,' 'Shirotae,' and 'Kojima' under the former name.

The delightful coloured illustrations by the author himself add charm to what will for long be a standard monograph.

R. H. STOUGHTON

"Yuccas of the South-western United States," Parts I and II. By Susan Delano McKelvey. (Published by the Arnold Arboretum of Harvard University, Massachusetts.) Part I (1938), \$5.00, and Part II (1947), \$10.00.

The first part of this Monograph was published in 1938 and deals with two sections of the genus, *Sarcocarpa* and *Clistocarpa*, found in the South-western United States. The second part, which appeared in 1947, deals with the other two sections, *Hesperoyucca* and *Chaenocarpa*.

The author has carried out a very full and complete revision of the literature of the genus, has consulted the material available in the major herbaria and has undertaken extensive field work in the area under consideration; as a result the distribution of the species can now be given in much greater detail than heretofore and new characters for the determination of the species have been adopted. In each part is given a key to the species, followed by a full description of each species, its synonym, references in literature and occurrence. Added to this most useful information is a very fine series of photographs taken by the author and reproduced in photogravure, showing the plants in their natural habitats, with close-ups to give the flowers in closer detail. In all there are 145 of these excellent plates.

As a result of her researches the author recognizes thirty-seven species and seven varieties. Although cultivated forms are not discussed, the gardener will find this monograph useful in helping to identify species and suggestive, if their natural habitat is studied, as to the best methods of treatment of the plants in cultivation.

VERA HIGGINS

"New Plants of the Year, 1947." By Charles H. Curtis and Roy Hay. Demy. 8vo. pp. 128. 8 pp. in colour. 60 half-tone Ill. 15s. (Latimer House Ltd.)

This new publication contains a descriptive list of all plants, flowers, fruit and vegetables which have received awards at the R.H.S. Shows or the Shows of the National Chrysanthemum Society and the National Rose Society during 1947. Such a book is undoubtedly welcome and coming from the Editors of the *Gardeners' Chronicle* little doubt will be felt as to its authority. The descriptions are necessarily very brief, but they are well supplemented by the generous number of illustrations given. If a reference to the Horticultural Colour Chart could be made in succeeding years it would greatly increase the value of these descriptions and illustrations. A useful list of the names and addresses of the exhibitors is also given. The genera are arranged in alphabetical order and this should prove a handy reference book for the future. We hope that its appearance will be an annual event.

P. M. SYNGE

"Flowering Shrubs for Small Gardens." By S. Duruz. 2nd Ed. 162 pp. Ill. (Lindsay Drummond). 7s. 6d.

The first edition of this book was published in 1939 and reviewed in R.H.S. JOURN. 64. 486 (1939). The second edition differs little from the first. War and post-war conditions have emphasized the value of shrubs to those who have little time and money for garden maintenance. This book gives a selection of those most suitable for the small garden.

"The Shorter British Flora." By C. T. Prime and R. J. Deacock. 376 pp. Illustrated. (Methuen & Co. Ltd.) 12s 6d.

Anyone who to-day contemplates writing a one volume Flora of Britain strikes at once a real difficulty—there are too many plants. It is impossible to say all that should be said about nearly two thousand species. Messrs. Prime and Deacock, in their

welcome and well-produced volume, have met this difficulty by omitting many of the rarer species and by giving very little information on the distribution of those that they include. On the other hand, they do find room for fairly extended notes on economic uses. Such questions of emphasis are matters of opinion, but many readers will no doubt wish that they had cut down these notes and found room for at any rate a mention of the many species now omitted (e.g. the Oxlip, Sweet Cicely and *Oenanthe pimpinelloides*), and for a brief indication of geographical distribution, at all events in Britain.

Despite this criticism, *The Shorter British Flora* is a useful and attractive introduction to our wild flowers. There are keys to the families and the species in each family, a glossary and clear, concise descriptions of over 700 species (here space might have been saved by the use of some abbreviations). The nomenclature is up to date and the excellent illustrations, by A. Swaffer and A. I. Charlton, add greatly to the ease and pleasure of using the keys.

"Wild Flowers Round the Year." By Hilda M. Coley. 176 pp. Ill (The Bodley Head.) 7/6.

Admirers of Miss Coley's volume, first published in 1933, will welcome this new edition, which she has considerably revised. It is written "for those who wish to have a friendly acquaintance with wild flowers," and Miss Coley's method is to take a selection of common species and to write, in simple language, about their biology, with special emphasis on pollination mechanisms. Miss Coley is an enthusiast and she conveys her enthusiasm successfully to her readers. Sometimes, perhaps, she is over eloquent and one wishes she would let the facts speak for themselves, but many will no doubt be led to love and to study our wild flowers with Miss Coley as their guide. There are sixteen plates, four of them in colour, of flower paintings by the authoress.

"Camellias." By G. G. Gerbing. 277 pp. Ill. (Fernandina, Florida.)

The authors' object in this volume is to present a life-like picture of the finest Camellias grown in America; and with the aid of a series of excellent colour plates he has certainly attained this end. The one hundred and eight full-page plates of varieties of Camellias in their natural size are, with but few exceptions, magnificently portrayed. In fact, some of the plates must be the envy of those people who are interested in colour photography in this country. Facing each plate is a brief description of the plant's habit of growth, its freedom of flowering, etc.

All the varieties illustrated and mentioned are of the japonica type. The short chapter on "New and Unusual Camellias," to an English reviewer, seems incomplete without the twentieth-century introductions of the species *C. saluenensis* and *C. reticulata* (wild form), now coming to the forefront in Camellia culture. Our American cousins, with their much more amiable climate, should become acquainted with these lovely plants and also with their offsprings; *C. x 'J. C. Williams,'* and *C. x 'Mary Christian.'*

The notes on Camellia propagation give a full account of the methods in America and the propagation from roots the size of a match stick and larger holds out distinct possibilities worth trying in this country. Mr. Gerbing states that pieces half to one inch long will send out eyes in early spring, and make shoots four to ten inches tall the first season.

Other subjects are ably dealt with in chapters entitled "Camellia Pests and Diseases," "How to cut and pack Camellia Blooms," and "Camellias month by month." Mr. Gerbing did not undertake to write a treatise on the "Genus Camellia," but to illustrate, and describe the cultivated forms grown in America, and in this he can claim to have admirably fulfilled his ambition.

FRANCIS HANGER.

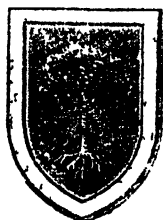
"The Lorette System of Pruning." By L. Lorette, translated by W. R. Dykes. Second edition, revised by F. J. Chittenden. 239 pp. Ill. (John Lane, 1948.) 10s. 6d.

In 1925 W. R. Dykes published an English translation of Louis Lorette's *La Taille Lorette* which had then reached its fourth edition, and thereby brought the Lorette system of pruning Pears and Apples to the notice of many an English gardener unable to read French. Lorette's methods have both enthusiastic advocates and disappointed critics in this country. Those who want first-hand information about the system, as practised by Lorette himself, will find it in this new edition of Dykes' translation, which Mr. F. J. Chittenden has revised and brought up to date by collating it with the eighth edition of *La Taille Lorette* published in 1932. Many of the illustrations have been redrawn and the value of the book to the English grower has been further increased by including a paper on summer pruning by Mr. A. H. Lees, which was originally published in the Report of the R.H.S. Conference on Apples and Pears in 1934 and gives an account of the methods he has adopted with success in the rainy west of England.

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JOURNAL OF THE ROYAL HORTICULTURAL SOCIETY

Vol. LXXIII



Part II

November 1948

SECRETARY'S PAGE

Programme of Meetings—The following Shows will take place during November and December:—

- { Tuesday, November 2—12 noon to 6 P.M.
- { Wednesday, November 3—10 A.M. to 5 P.M.
- { Tuesday, November 30—12 noon to 6 P.M.
- { Wednesday, December 1—10 A.M. to 5 P.M.

At the Show on November 30 and December 1, there will be a Late Apple and Pear Competition, schedules of which may be obtained from the Secretary.

Lecture—At 3 P.M. on Tuesday, November 30, in the Lecture Room of the New Hall, MR. J. S. L. GILMOUR and MR. F. E. W. HANGER, the Director and Curator of the Society's Gardens, will deliver a lecture on "Recent Developments at Wisley."

Kindred Societies' Shows—In conjunction with the Show on November 2 and 3 the British Carnation Society will hold a Show in the Old Hall. Applications for the schedule should be sent to the Hon. Secretary, British Carnation Society, 23 Russell Chambers, London, W.C. 2.

The National Chrysanthemum Society will hold a Show in the New Hall on November 4 and 5. Fellows Tickets will not admit but entrance may be obtained on payment of 2s. 6d. at the door.

Demonstrations at Wisley—The following demonstrations will be given at the Society's Gardens at Wisley during November and December, in each case the demonstration on the second day being a repetition of that on the first:—

Wednesday and Thursday, November 3 and 4, Planting of Fruit Trees and Roses (2-4 P.M.).

Wednesday and Thursday, December 1 and 2, Pruning of Fruit Trees (2-4 P.M.).

Distribution of Seeds—It has been decided this year to defer the publication of the seed list until the December JOURNAL. This has been found necessary partly because the JOURNAL has to go to print earlier this year in order to ensure prompt publication and partly to give us sufficient time for collecting seeds to ensure that the list is as complete as possible.

Calendar for 1949—Arrangements have been made to hold the following Shows in 1949. Lectures are being arranged to take place on the afternoon of the first day of each Show, except on the occasion of the Annual General Meeting and at the Chelsea Show.

Calendar of Shows

February 15 and 16	Fortnightly Show. (Annual General Meeting at 3 P.M. on February 15).
March 1 and 2	Fortnightly Show.
March 15 and 16	Fortnightly Show.
March 29 and 30	Fortnightly Show. Horticultural Machinery Show.
April 12 and 13	Fortnightly Show. Daffodil Show.
April 26 and 27	Fortnightly Show. Rhododendron Conference.
April 27 and 28	Horticultural Machinery Demonstration at Wisley.
May 24 to 27	CHELSEA SHOW.
June 14 and 15	Fortnightly Show.
June 28 and 29	Fortnightly Show.
July 12 and 13	Fortnightly Show.
July 26 and 27	Fortnightly Show. Summer Fruit and Vegetable Show.
August 9 and 10	Fortnightly Show.
September 6 and 7	Fortnightly Show.
September 20 and 21	Fortnightly Show.
October 4 and 5	Fortnightly Show. Autumn Fruit and Vegetable Show.
November 1 and 2	Fortnightly Show.
November 29 and 30	Fortnightly Show.

1948 Examinations

EXAMINATION FOR TEACHERS OF SCHOOL GARDENING—The written parts of the Examination for Teachers of School Gardening were held in July, and the practical part of the Final was held at Wisley in August. At the Preliminary Examination there were one hundred and sixty-five candidates, of whom one hundred and thirty-two satisfied the examiners that they should be allowed to proceed to the Final Examination when they have had three years' experience of teaching school gardening.

Twenty-one candidates presented themselves for the Final Examina-

tion for Teachers of School Gardening, of whom the following sixteen

MISS A. M. ALMOND
MR. C. G. BARNES
MISS P. R. BLOOMER
MR. C. BURROWS
MR. J. C. HIGLEY
MR. G. E. HUMPHREY
MR. J. G. LAWSON
MR. R. W. MAJOR

MR. C. A. MARKS
MISS I. C. REID
MR. G. E. ROBINSON
MISS C. ROLAND
MR. G. A. SENTENCE
MR. H. WATSON
MISS E. L. WEBB
MR. R. WRIGHT

EXAMINATION FOR THE NATIONAL DIPLOMA IN HORTICULTURE WITH HONOURS—Four candidates entered for the N.D.H. (Hons.) Examination, the written part of which was held in April and the practical part in September. The N.D.H. (Hons.) has been awarded to the two following candidates:—

MR. W. HEYDECKER

MR. A. P. PRESTON

Publications—*Fruit Year Book, 1948*. It is hoped that this may be available during November. This publication has been enlarged since last year and includes important articles on many aspects of fruit growing both in this country and overseas. Price will be 8s. 6d., postage and packing 9d.

WISLEY IN NOVEMBER

A VISITOR to the Gardens at this season is greatly at the mercy of our variable climate, and while several days are certain to be highly unsuitable this month often produces opportunities when autumn sunshine and clear skies make a visit to Wisley both enjoyable and instructive.

Most of the flowering plants are now to be found in the glasshouses, while out of doors coloured foliage and fruit provide the main attractions.

The Half-Hardy House contains a number of interesting flowers in addition to those mentioned last month. *Cuphea micropetala* has been in bloom for several weeks, *Cyrtanthus Mackenii* var. *Cooperi* (*lutescens*) carries several umbels of tubular pale-yellow flowers, and another South African bulb, *Tulbaghia pulchella*, has several tall stems crowned with mauve blossoms. Trained along the roof supports the yellow *Calceolaria Pavonii* continues to flower and *Mandevilla suaveolens* produces a few late blossoms among its most unusually shaped seed-pods.

In the Temperate House, Ericas and Epacris are prominent amongst a rapidly increasing display of Camellias. *C. Sasanqua*, represented here by the variety *fragrans*, is already in full flower, closely followed by *C. saluenensis* and the hybrid 'J. C. Williams,' while the first buds are expanding on the early varieties of *C. japonica*. Planted in the centre bed *Jacobinia pauciflora* has formed a bush almost 4 feet high and as much through, each growth terminating in masses of orange and yellow

flowers that continue to appear over a long period. Near the roof glass, several of the Acacias are carrying a large number of buds and the first yellow ball-like flowers will be opening towards the end of the month.

Behind the glasshouses the large tree of *Parrotia persica* sheds a little more of its autumn finery with each passing wind and in the Azalea Garden the original bush of \times *Berberis rubrostilla* forms a glowing mound of carmine-scarlet leaves and fruits.

The Pinetum offers an interesting walk to Howard's Field on an afternoon of autumn sunshine ; several of the Conifers assume tinted foliage for the winter months and of these the reddish-purple *Cryptomeria japonica* var. *elegans* is generally the most colourful, while the deepening green of the Pines provides a pleasant background for the variegated varieties of Lawson's Cypress and the coloured forms of *Chamaecyparis obtusa* and *C. nootkatensis*.

In Seven Acres, *Berberis* fruits in many colours are still prominent and the later ripening *Cotoneasters* are beginning to display their sealing-wax red berries ; the evergreen *C. lactea* is a most satisfactory plant in this respect and well worthy of wider planting. Near the pond 'Sea Buckthorn,' *Hippophae rhamnoides*, is carrying a large crop of orange-coloured fruits that will last into the New Year as they are generally not relished by the birds ; male and female forms should be planted together to obtain the best effects as the species is dioecious.

The Heath Garden is chiefly coloured by the warm russet of past flowers on *Erica vagans*, but purple bells still linger on *Daboecia polifolia* (*cantabrica*) var. *purpurea* and the later varieties of the common Ling, *Calluna vulgaris*, while autumn tints of many shades fill the border nearer the boundary.

Passing into the Wild Garden the woodland scents of autumn and the slowly shedding scarlet and crimson of the *Vacciniums* and *Enkianthus* mark the passing of the season. Near the entrance to the Alpine Meadow the beds of *Gentiana sino-ornata* still hold expanded blue trumpets to the sky and numerous newly planted *Primulas* promise a brilliant spring display.

The Award of Garden Merit collection contains our largest specimen of *Viburnum fragrans* and every mild day sees a succession of sweetly scented pale-pink flowers ; starting in late September before the bronze-red leaves have fallen and continuing until April when the last blossoms give way to the expanding foliage.

Flowers on the Rock Garden are only found by diligent searching at this season of the year, but the later *Gentians* still linger, with pink spikes of *Polygonum*, and here and there the fresh blooms of *Crocus*, a genus also well represented in the frames near the Alpine House.

Near the Hornbeam hedge bordering the Floral Trial Grounds a small tree of *Prunus subhirtella autumnalis* var. *rosea* will be producing a succession of dainty pink blossoms, a little deeper in colour than those of the type *autumnalis* which will be found in flower on Battleston Hill, while both are also planted in the new Cherry Field.

On the Hill a small winter garden has been formed beyond the public footpath, and here *Viburnum fragrans* in various forms, *Hamelis*, early flowering *Rhododendrons*, *Helleborus*, and several fine

varieties of *Camellia Sasanqua* have been freely planted. The latter were in full flower last year during November and aroused great admiration.

The new path is being continued round the base of the hill and the woodland filled by transplanting the Rhododendrons previously accommodated in nursery beds in this part of the Gardens. In the Dell several large plants of *Mahonia japonica* are slowly expanding their long racemes of sweetly scented primrose-yellow flowers; other prominent shrubs include several fine *Stranvaesias* with either red or yellow berries, and often brightly coloured leaves during the winter months, while the many evergreen Rhododendrons provide a pleasing contrast to the green and white of the Snake-bark Maples and the rugged beauty of the great Pine trunks.

The Vegetable Trial Grounds contain a large trial of Brussels Sprouts now in full bearing, a smaller planting of Leeks, many rows of autumn-sown Spinach and Lettuce, and a large plot of Parsnips that are being used for field experiments in the search for a control for Parsnip canker.

During the summer months the approach to the Gardens has been greatly improved by the resurfacing of the road on the east side of the Laboratory and of the footpath leading to the main entrance. Some of the main paths inside the Gardens, which in the past have frequently suffered serious erosion in periods of heavy rain, have also been dressed with tar and rolled pebble, which will provide a durable surface. Repairs and repainting of the glasshouses are almost complete. The whole of the hot-water heating system has been thoroughly overhauled, and new concrete staging has replaced the original ironwork which had become badly worn after more than forty years' service.

MASTERS MEMORIAL LECTURES, 1948

NUTRITION PROBLEMS OF HORTICULTURAL PLANTS, WITH SPECIAL REFERENCE TO TRACE ELEMENTS

T. Wallace, C.B.E., D.Sc.

PART I

(DR. H. V. TAYLOR, C.B.E., V.M.H., *in the Chair*)

IN recent years two important aspects of plant nutrition have been discussed in these lectures. In 1937 SIR EDWARD SALISBURY took as his subject "The plant and its water supply" and last year DR. SWARBRICK reviewed the results of investigations on "Growth regulating substances in plants" and described their applications in horticulture.

In reading the accounts of these two lectures in the Society's JOURNAL, one is struck by the great variety of effects on plants which are attributed to water and to growth substances, and the gardener seeking to explain abnormalities in his plants may well be excused if he fails to diagnose the cause of his troubles. But even so we may ask: Have these two aspects exhausted the practical possibilities? Let me quote DR. SWARBRICK's concluding remarks. "May I, in conclusion, plead for caution and discretion? It is so easy to ascribe all and every phenomena of nature as an effect of growth regulating substances or hormones. But there still remains the known effects of manures, nutrients and mineral nutrition upon plant growth. Where observed phenomena can be otherwise explained, then let us use these explanations until they are no longer adequate to encompass all the known facts."

In the present lectures I am to deal with this third aspect of mineral nutrition, recognized by DR. SWARBRICK as coming before growth-promoting substances when seeking to solve garden problems. I am afraid, however, I must warn you at this early stage that the picture is again one of complicated pattern, though it has the advantage that the practical gardener can make his own simple tests and often bring about spectacular effects by simple remedies which may serve to stimulate and encourage his further investigations.

The practical problems of the mineral nutrition of plants mainly concern soils and the use of manures and fertilizers. I realize that the subject of manuring is a very controversial one among gardeners, for there are still those who hold that manuring in the garden should be restricted to the use of natural manures, composts, peat and lime, and that fertilizers—the despised "artificials" of many—are not only useless but harmful.

At this point, whilst strongly supporting the use of natural manures for many purposes, I must state categorically that in my opinion they are inadequate to ensure the proper mineral nutrition of garden plants and must be supplemented by fertilisers for many crops. Moreover, the

old policy of repeated dressings of manure plus lime may lead to disastrous results on many soils. Even for intensive pot work under glass with both seedlings and older cultures MR. LAWRENCE, at the John Innes Institution, has shown that the old-fashioned organic medium can be greatly improved by the judicious incorporation of mineral fertilizers.

It may well be that the days of the sufficiency of the old natural methods are gone. Supplies of the natural manures we know are short and many gardens cannot be self-sufficing as regards compost when heavy crops are to be removed from them. On model allotments at Long Ashton during the war we estimated that the composted waste from the vegetables grown would only provide a dressing for one-third of the area annually, and production could only be maintained by supplementary dressings of fertilizers.

Again, let us think of our own gardens or of any famous gardens with which we are familiar. Are the plants in them adequately nourished so far as mineral nutrients are concerned? It is easy for me to recognize deficiencies in my own garden, though some of these I retain for interest and others for their aesthetic values. Of the many large gardens with which I am familiar I know of none in which deficiencies are not evident, and it is often only too obvious that their effects are both serious and undesirable. Observation in such cases shows beyond doubt that we cannot get maximum production from our soils without ensuring adequate supplies of mineral nutrients by means of special fertilizer treatment.

May I further illustrate the importance of mineral nutrients in crop production at the present time and show how important it is to have a knowledge of their effects by referring to some special examples?

During the war you will remember that many so-called "marginal lands," generally regarded as uneconomic for arable crop production, were ploughed up and cropped. In the initial stages there were inevitably failures, and these were usually due to soil acidity and mineral deficiencies. In the latter category, in certain areas there were fields which, it was stated, had been regarded for generations as incapable of carrying arable crops no matter the treatment given. Under no circumstances should they be ploughed. In these instances it was invariably shown that the cause of failure was a deficiency of one of the trace elements, usually boron or manganese, against which apparently dung had provided no remedy. Again, in one particular area, widespread failures of market garden crops occurred, due to manganese deficiency, where for years the basic treatment had been stable manure and lime. The problem—may I add—had actually been created by this treatment.

Recent years have also witnessed the development of hydroponics and soil-less cultures, even for commercial purposes, in which the plants are nourished entirely by means of solutions of mineral salts passed through gravel or sand, and by this method very high yields have been claimed, sometimes well above those normally attained in soils. Will this method ever attract gardeners in any measure? So far, it has been used for certain choice flower crops in glasshouses and is excellent for Carnations and Tomatoes. It is also significant that during the war the

U.S.A. authorities used the method on a large scale in the Pacific campaign to produce vegetables for their troops under conditions where soil cultures were impossible. Correct mineral nutrition is, of course, essential for the success of such a venture.

Recently, whilst in the U.S.A., I was shown some experiments in which Orchids are being grown in gravel free from organic matter and are fed entirely with chemical solutions. The experiments are still in the early stages but it may be said that the chemically fed plants compare favourably with the controls grown in the usual way. The results of these experiments will be of more than usual interest from the standpoint of mineral nutrition.

Now we may ask "What have been the limitations of mineral fertilizers in the past?" They do not, of course, supply humus which is so vital for many purposes in the garden, but there is another reason why they have not even supplied the essential mineral elements. The so-called "complete fertilizers" only purport to supply nitrogen, phosphorus and potassium, although they actually contain other nutrient elements as impurities, and it will be seen later that this emphasis on these three elements may be a very serious drawback, particularly for horticultural crops, many of which have high requirements for other elements.

In presenting to you in these lectures the broad picture of the problems of mineral nutrients in the garden, I propose in the first place to outline to you some of the present-day views on the mineral nutrition of plants, and then to show how these may be applied in your gardens to achieve the objects of your various endeavours, whether these be primarily to please the eye with flowers and foliage, to produce choice fruits for the table or show bench, or to cater for the needs of the kitchen with a variety of nutritious vegetables. In doing so, I shall refer especially to the particular problems of the so-called trace elements in the nutrition of horticultural crops and show that they are not merely of academic interest but of fundamental importance in many branches of garden culture.

MINERAL NUTRIENTS REQUIRED BY PLANTS

The mineral nutrients required for the healthy growth of plants are generally classified in two groups: (a) elements essential for growth and (b) beneficial elements. The criteria of essentiality of any element have been stated as follows: (1)

1. The element is necessary to complete the full growth and reproduction cycles of plants.
2. It cannot be completely replaced by any other element for these purposes.
3. Its action on the plants must be direct.

The essential elements are twelve in number and they may be subdivided into two sub-groups on the basis of the amounts required by plants, as under:

Major elements: those required in relatively large amounts—nitrogen, phosphorus, calcium, magnesium, potassium, sulphur.

Trace or minor elements or micro-nutrients: those required in only small amounts—iron, manganese, copper, zinc, boron, molybdenum.

It must be pointed out that trace elements are just as necessary as major elements for the healthy growth of plants, and that acute deficiencies due to members of both categories may result in total failures. Moreover, the present list of essential elements must not be regarded as a final one. They are the elements which so far have been *proved* to be essential; there may be many more, but if so they are likely to be required only in very small quantities and hence it will be very difficult to prove their essentiality. It may appear strange to you that with refined apparatus and materials it is difficult to create deficiencies of certain essential trace elements, *e.g.* boron or copper, when in practice there are literally hundreds or even thousands of acres of crop failures due to them, but nevertheless this is so.

The beneficial elements are those which may increase yields of particular plants or help indirectly in growth. Examples of such elements are sodium, chlorine, silicon, aluminium and nickel. The action of sodium in increasing the growth of Beet and Mangold is perhaps the best known effect of a beneficial element in practice.

The point now arises as to whether all these elements are of importance for horticultural plants and, if so, what is the nature of the effects associated with each of them. The answer to the first of these questions is very definitely in the affirmative, and as regards the second it may be stated that each element may be concerned with acute deficiency problems in crops whilst some also produce injurious effects from excesses. The last element to be added to the essential list was molybdenum (1939) and this has already been shown to be of great practical importance for leguminous crops and maybe, as I shall show later, for a number of common horticultural crops (2).

THE SPECIAL EFFECTS OF EACH ELEMENT ON PLANTS

It is of interest to consider the special effects associated with deficiencies and excesses of the various elements as these may be used in the diagnosis of practical problems in the garden.

The effects are most conveniently discussed under the three headings of deficiencies and excesses of the various elements and the relationships (or ratios) between certain elements.

The effects which will be discussed concern the amount and type of shoot growth, foliage characters, defoliation phenomena, flower formation and time of flowering, fruiting and characters of the fruits, and root growth.

The main effects may be summarized as follows:

DEFICIENCIES

Nitrogen. Shoot growth is small and shoots are upright, thin and woody; foliage is sparse, leaves pale or yellow green, later developing high orange, red or purple tints; defoliation is premature, beginning at the older leaves, and tints are high; flower-bud formation is greatly reduced and flower buds open late; fruits are likewise sparse, small,

hard of texture, may be sweet or woody to taste and the skin is highly flushed; they store well. The barks of trees tend to be brown or reddish brown.

Phosphorus. The effects are generally similar to those of nitrogen deficiency, but leaf colour may be a dull purple or dull olive green; fruits are soft, may be flushed and are sharply acid, often thick-skinned and poor keepers.

Calcium. The effects are mainly near growing points, at the tips of shoots and roots; wilting of shoots, petioles, leaf laminae and pedicels is common; Potatoes fail to produce healthy tubers. Seeds may fail to form.

Magnesium. The outstanding effects concern leaf characters and defoliation. The leaves may be chlorotic or develop characteristically tinted patterns, either between the veins or around the margins, or intervenal or marginal areas may develop necrosis without tints. Symptoms first appear on the older leaves and spread progressively to the younger ones. Affected leaves defoliate prematurely and trees may lose most of their foliage early in the season. Fruits may fail to ripen because of defoliation and remain woody and immature.

Potassium. Growth is dwarfed and thin, and internodes become short; shoot die-back is prevalent in acute examples; leaves may be bluish-green or somewhat chlorotic, and the margins usually turn brown or greyish brown (leaf scorch); on some plants the leaves develop characteristic spotting patterns (Clovers and Potatoes); flowering is not greatly reduced in the early stages when there may be many young shoots formed (excess tillering) but later flower buds are sparse; flowers tend to open early and fruits which are set fall heavily; fruits remain small and useless, colour is variable and ripening is delayed; texture of fruits is generally woody and flavour sub-acid and sweet.

Sodium. Sodium deficiency, where this element is beneficial, is denoted by dark green, thin, lustreless leaves which wilt easily; leaf margins may scorch, as in Beet.

Sulphur. The effects are generally similar to those of nitrogen deficiency, the foliage tending to be pale and to develop bright tints.

Iron. The characteristic effect of this deficiency is chlorosis of the young leaves, which tends to progress in a basipetal direction; chlorosis generally develops according to a well-defined pattern over the leaf surface in which the fine sub-lateral veins can be clearly seen (*cf.* manganese); shoots die back from tips; fruits are highly coloured or chlorotic.

Manganese. This deficiency produces a wide variety of effects on different plants. On fruit plants the most characteristic condition is chlorosis of the foliage, which may usually be easily distinguished from that due to iron by two characters: (1) the effects are not usually most severe on the young leaves at the tips of the shoots, (2) the chlorosis begins near the margins of the leaves and progresses in a V-shaped pattern intervenally towards the midrib; like iron, chlorosis may be followed by die-back of the shoots. On Brassicas it may be impossible to distinguish visually between chlorosis due to deficiencies of iron and manganese. On some crops very characteristic lesions or spots are

developed on the leaves—Potatoes, Beet, etc.—and on Peas and Beans the seeds show characteristic lesions (Marsh Spot).

Copper. The main effects are produced at the growing points which either fail to develop or die-back; leaves may be either dull bluish green or chlorotic. In trees die-back may be associated with gumming and deformed swollen growths; tillering may be excessive and seed formation is markedly reduced.

Zinc. Shoots are dwarfed and internodes short; leaves are small and narrow, and when crowded, due to short internodes, on trees give a characteristic "rosette" effect; foliage may show a mottled chlorosis, as on Citrus species.

Boron. This deficiency is characterised by a lack of differentiation of meristematic tissues, which results in the death of growing points and deformation of developing tissues. The variety of effects produced may be illustrated by the following descriptive names: "heart" or "crown rot" of Sugar Beet and "canker" of Table Beet; "hollow stem" and "browning" of Cauliflower; "cracked stem" of Celery; "brown heart" or "raan" of Swedes and Turnips and "cork" or "corky core" of Apples. It should be noted that affected crops are generally useless.

Molybdenum. The effects of this deficiency are not yet known for a wide variety of plants but from the limited studies made the following may be stated. Growing points may be killed; foliage may show mottled chlorosis in young plants; leaf margins tend to curl forward and in Brassicas older leaves may appear abnormally large, with wide laminae, whilst younger leaves may be devoid of laminae and consist entirely of elongating midribs (cf. "whiptail" of Cauliflower and Broccoli); pedicels may wilt and fruiting be greatly reduced.

EXCESSES

Manganese. The effects of excess of this element may resemble those due to deficiency of it. Thus leaves may show chlorotic mottling (Runner and Dwarf Beans, Sugar Beet) or brown spotting (Potato); other leaf effects are lateral restriction of growth of laminae with chlorosis, incurling and necrosis of margins (Brassicas) and discoloration of the veins (Potato); petioles and stems may develop lesions (Potato and Tomato) followed by collapse and withering of leaves. Excess of manganese may also induce a deficiency of iron.

Aluminium. Roots are severely curtailed or fail to develop and appear swollen and lack fibre. The above-ground portions of the plants have the appearance of phosphorus deficiency and may actually be deficient in this element.

Chlorine. Chloride toxicity effects may be confused with those caused by potassium deficiency since the leaves often show brown marginal scorch. Growth, however, is more normal and internodes are not shortened.

Boron. The effects produced comprise a distinctive marginal and intervenal scorching of the old leaves.

Heavy metals (including copper, zinc, nickel, cobalt and chromium), all produce severe chlorosis and intervenal necrosis. The chlorosis may be largely or wholly the result of induced iron deficiency.

RELATIONSHIPS BETWEEN ELEMENTS (*i.e.* NUTRIENT RATIOS)

The problems concerned here may be regarded as problems of relative excesses or lack of balance between elements. A general idea of how elements may be mutually helpful or antagonistic is well illustrated by data obtained in experiments at Long Ashton.

Some of the more important ratios which have been established in experiments are as follows:

N/P; N/K; N/Mg; K/Mg; K/Fe; Mg/Ca; Na/Ca;
Ca/Mn; K/Mn; P/Zn; Heavy metals/Fe.

In all these examples, with the exception of N/Mg and K/Fe, the first named element tends to depress the intake of the second and to induce a deficiency of it. In the two exceptions the first element is helpful to the second and tends to alleviate any deficiency of it.

CONDITIONS UNDER WHICH DEFICIENCIES, EXCESSES AND UNFAVOURABLE RATIOS OF NUTRIENTS OCCUR

The conditions which cause deficiencies, excesses and unfavourable ratios may arise from the nature of the soil, climatic factors, cropping systems followed, the special requirements of particular crops and the management practices applied to the crops, particularly manurial and cultural practices. The subject has been fully discussed in a recent paper by the writer (3).

The following summarizes the main points for each element.

DEFICIENCIES

Nitrogen. Deficiency of this element is of very general occurrence and all gardeners are familiar with the spectacular results which may be obtained from the use of nitrogenous fertilizers on leafy crops such as the Brassicae. It is particularly liable to occur on soils with low content of organic matter and on wet soils, and in seasons of high rainfall when soil leaching is excessive and aeration poor. It is also common in acid soils, due to lack of nitrification, and on shallow, eroded soils where bacterial activity is low. The deficiency is easily created by excessive cultivation, resulting in destruction of organic matter, and insufficient cultivation, allowing of the rank growth of weeds, by over-cropping with leafy crops with high nitrogen requirements and by too close spacing of plants, the last of which can be readily demonstrated in any old seed bed. Although it is well known that manures and composts containing high proportions of straw may bring about temporary deficiencies of nitrogen it is not generally recognised that dung may be too low in available nitrogen for many crops and may limit production because of this fact.

This last point is well shown in results from a rotational experiment at Long Ashton for which the results are summarised in Table I. It will be seen that dung fails to give good results for the high-nitrogen Brassica crops.

It must be realised that bacterial activity determines the supplies of nitrogen available to plants in soils and that, given a source of energy,

TABLE I

Crop	Season	Manurial Treatments					
		Dung	N.P.K.	N.P.	N.K.	P.K.	N.
Savoy . .	1940	5.5* (5)	7.1 (2)	7.4 (1)	6.0 (4)	3.8 (6)	6.1 (3)
Carrot . .	1941	34.6* (2)	34.6 (2)	30.9 (6)	35.6 (1)	32.6 (4)	32.6 (5)
Onion . .	1942	3.7 (2)	3.04 (3)	2.17 (5)	4.35 (1)	1.66 (6)	2.45 (4)
Spring Cabbage†	1942-43	5.5 (5)	7.5 (1)	7.5 (1)	6.0 (4)	3.0 (6)	7.0 (3)
Cauliflower .	1943	8.3 (4)	9.6 (2)	10.3 (1)	7.2 (5)	3.9 (6)	8.5 (3)
Beet . .	1944	10.18 (2)	10.75 (1)	6.79 (4)	7.77 (3)	5.72 (5)	3.92 (6)
Potato . .	1945	14.72 (1)	13.73 (3)	10.36 (4)	14.49 (2)	8.41 (6)	9.65 (5)

* Dung at 5 tons per acre these crops; later crops at 10 tons per acre.

† The results for crop are for visual markings, as yields not obtained.

such as any carbohydrate material, *e.g.* straw, sugar, sawdust, etc., the bacteria will tend to convert the more soluble forms of nitrogen in the soil into others which are at least temporarily unavailable to plants.

Horticultural plants also vary greatly in their nitrogen requirements, the leafy Brassicas and Tomatoes needing large amounts, whilst root crops and many fruits which store large amounts of carbohydrates benefit only from moderate supplies.

Phosphorus. This deficiency, like nitrogen, is of very general occurrence and is particularly prevalent in acid soils, where the natural phosphates become "fixed" and unavailable to plants, and in clay soils. In Great Britain the acid soils occur on a large scale in the west and north in the high rainfall areas, and it is in these districts that the needs for phosphates are greatest. As for nitrogen, particular crops show wide

TABLE II

SHOWING THE RELATIVE FIXING POWERS OF SOME LIGHT AND HEAVY SOILS FOR PHOSPHORUS

	Percentage of Phosphoric Acid soluble in 1 per cent. Citric Acid solution					
	Light Sands			Clays		
Surface Soil .	0.1730	0.0865	0.0602	0.1158	0.0601	0.0485
Subsoil . .	0.0734	0.0616	0.0230	0.0124	0.0085	0.0011

variations in their requirements for phosphorus, legumes needing specially high amounts, whilst many tree crops, such as the hardy fruits, seem to grow well even when soil supplies are low. Most crops show spectacular responses to phosphorus in the seedling stage, which are often less obvious as the plants mature, and there is no doubt that the element is often most profitably used in the garden in promoting the rapid establishment of young plants.

It should be noted that in most old gardens the content of phosphorus is abnormally high and this may have the disadvantage of inducing premature ripening. The differential fixing powers of soils for phosphorus is also a point of importance where supplies of the nutrient are intended for the subsoil layers.

Calcium. Deficiency of calcium occurs under two conditions—on acid soils where the calcium has been leached out by hydrogen ions and on alkali or saline soils where the element has been replaced by sodium. Soil acidity is most prevalent on soils derived from acid rocks, such as siliceous sandstones, and in districts of high rainfall. Alkali soils occur in areas where rainfall is deficient and evaporation is excessive, causing the upward movement of water to predominate.

In practice calcium deficiency is controlled on acid soils by routine applications of lime. It should be noted, however, that calcium deficiency is not the only cause of crop failures on acid soils. This problem is fully discussed later.

Magnesium. Magnesium deficiency, like calcium deficiency, is mainly confined to light-textured acid soils and to sodium soils. It is most prevalent in Great Britain in wet seasons and is often induced by heavy dressings of potassium fertilizers or by nitrogen deficiency. As many horticultural crops are highly susceptible to the deficiency—much more so than farm crops—it requires special attention in the garden, *e.g.* in fruit crops, Tomatoes, Brassicas and Potatoes.

Potassium. The occurrence of this deficiency is closely related to soil conditions and also to the special needs of particular crops. It tends to occur on sandy soils, chalk soils, shallow soils and poorly drained soils. This last condition is important because the poor aeration of such soils may prevent the intake of the element by plants even when liberal fertilizer dressings are given. The differing needs of crops may be easily demonstrated by comparing the growth of Brassica crops (low K requirement) and Potatoes (high K requirement) on low potassium soils. (See Table I.) Fruit crops also have high requirements for potassium.

Sulphur. This deficiency is unknown in Great Britain, possibly due to the density of population and the highly industrialized character of the country. It only occurs on excessively leached soils and eroded soils remote from areas where the atmosphere does not carry appreciable amounts of industrial sulphur gases.

Iron. The conditions leading to a deficiency of iron in plants have been shown to be very complex, factors both external to the plant and within the plant being concerned, and it is not always clear whether the actual deficiency arises in the soil or in the plant tissues.

The problems concerned may be grouped under four headings on the basis of causal factors, *viz.* (4).

1. Simple deficiency of iron, *i.e.*, where the total supply of iron in the soil is inadequate for healthy growth.
2. Lime-induced chlorosis, a condition of iron deficiency occurring on calcareous soils.
3. Deficiency resulting from excesses of other mineral elements.
4. Deficiency resulting from deficiencies of other elements.

Since it is doubtful whether a simple deficiency of iron ever occurs in practice, owing to the prevalence of iron in all rocks and soils, iron deficiency is usually regarded as an induced deficiency which must be guarded against by the use of suitable soils and cultural practices.

Lime-induced chlorosis is by far the most important and common form of iron deficiency and here the cause is associated with the presence of carbonate of lime in the soil. Its control is primarily a matter of avoiding calcareous soils and of refraining from using lime where the soil is not acid. In the case of tree crops the trouble may often be greatly reduced by practising methods of grass culture.

Deficiency of iron due to excesses of other mineral elements may occur on acid soils, especially from excess of manganese, and on soils to which industrial wastes containing metallic compounds have been added.

Potassium deficiency is the most common deficiency associated with lack of iron and under these conditions, as in the case of excesses, the deficiency seems to arise from the precipitation of iron within the plant tissues.

It should be noted that horticultural plants are much more susceptible to iron deficiency than farm crops, and that tree and hardy fruit crops are more susceptible than vegetables.

Manganese. Manganese is widely distributed in rocks, though mainly in the form of insoluble minerals, such as ferro magnesian and other complex silicates, not likely readily to furnish available Mn to plants. The important soil forms for plants are replaceable divalent manganese and manganese dioxide. Like iron the main problem of manganese supply is that of available Mn and not of total Mn. The important conditions determining the availability of Mn are pH and the oxidation/reduction conditions, high acidity and low oxygen supply favouring high availability.

The striking feature of manganese nutrition in plants is the extremely wide range of the element found in plant tissues, ranging from under 10 p.p.m. in deficient plants in alkaline soils to over 10,000 p.p.m. in some instances of toxicity in strongly acid soils. Soil organisms appear to play an important part in manganese availability between pH 6.0-7.9, and QUASTEL (5) has demonstrated a well-defined Mn cycle in soils under aerobic conditions.

In practice it has been shown that Mn deficiency in crops is associated with special soil conditions, important factors being high pH (above 6.0-6.5), high content of organic matter and often a high water table (excluding waterlogged conditions).

The main conditions are as follows: alkaline peats and peats overlying calcareous subsoils; calcareous alluvial soils with high water tables;

calcareous soils with impeded drainage; overlimed humus podsoils; eroded podsoils with loss of humus layer; newly ploughed old grassland on calcareous soils; burnt-over organic soils; over-limed garden soils.

The absorption of manganese by plants is decreased by high calcium or high potassium, and it has been recently observed in Holland that manganese deficiency was very prevalent on soils reclaimed from the areas flooded by sea water during the war.

It should be noted that many garden plants are highly susceptible to manganese deficiency, among which may be mentioned ornamental and sweet Cherries, Peaches and Nectarines, Apples, Raspberries, Roses, Garden Beet, Spinach, Peas, Dwarf Beans, Potatoes and Cos Lettuce.

Copper. This deficiency is prevalent on many heather-covered moorland soils in North-West Europe—in Holland, Denmark and Norway—and often causes crop failures when such soils are brought under arable cropping, so much so that the failure condition has been usually referred to as “reclamation” disease. In other parts of the world it occurs on poor acid and calcareous sands and on many types of peat soil. The deficiency has recently been demonstrated by DR. PIZER on some reclaimed Fen soils in East Anglia. Deficiencies are more liable to occur on continuously cropped arable soils than on soils occasionally put under leys, and grass is considered to mobilise “available” copper in soils. Availability, on the other hand, is progressively decreased by lime dressings and a high content of organic matter is also unfavourable. Soils show considerable differences in their powers for “fixing” copper in an unavailable form, the magnitude of which may be judged by the fact that, whilst on some soils a dressing of 7 lb. copper sulphate per acre may suffice to correct an acute deficiency and a relatively small increase over this prove toxic, on others as much as 150 lb. per acre may be required to ensure healthy growth.

Zinc. The problems of zinc supplies in soils are generally similar to those described for copper. Deficiencies of the element occur on soils with a wide range of pH, instances having been recorded over a range of pH 4.0–8.5. Zinc deficiency has been reported from many countries and large increases in yields from zinc have been obtained by DR. ROACH on farm crops on some Romney Marsh soils.

Both the total content of zinc in the soil, particularly on acid soils, and the availability, especially on soils of high pH and of high organic matter content, are important in determining zinc supplies to plants.

Acid sands and gravels and alkaline soils high in organic matter are most liable to be associated with zinc deficiency. Excessive arable culture is conducive to the deficiency and natural weed cover tends to increase available supplies. Lime and phosphate applications may induce the deficiency and soil organisms may also “fix” zinc and render it unavailable. The effects of zinc deficiency are increased by bright sunlight. Plants show marked differences both as regards susceptibility to zinc deficiency and in accumulating zinc from soils. Citrus crops provide the outstanding examples of high susceptibility to the deficiency.

Boron. Boron has been shown to occur in rocks and soils in two distinct forms, either as the highly resistant mineral tourmaline, which is

widely distributed but which appears of little value for plants, or in forms accumulated in marine sediments or concentrated by plant residues, which are mainly readily available to plants. These latter compounds of boron are easily leached from soils and this is reflected in the high concentration of boron in sea water (4.5 p.p.m.) and the high content of many marine sediments. It is thus important to prevent the loss of boron from soils by leaching, and in nature this is largely done by plants with high requirements for the element.

The main factors determining the availability of boron to plants in soils are leaching, organic matter content, texture, moisture content and lime status.

In practice, boron deficiency has been most prevalent on highly leached acid soils, particularly sands, which is clearly demonstrated by a study of boron deficiency areas in U.S.A. (6) and European countries.

It has also been common experience that boron deficiency is most prevalent in dry seasons and that it is increased by liming.

Plants show wide variations in susceptibility to boron deficiency; Apple, Beet, Lucerne, Brassicae and Celery may be cited as susceptible crops, and Grasses and other monocotyledons as resistant plants with low requirements for the element.

Molybdenum. This element is widely distributed in plants and soils, though in small amounts, whilst mineral oils and coal ashes appear generally to contain exceptionally high concentrations. Available molybdenum is probably mainly circulated in soils through vegetation and animal life and in this connection the content of molybdenum in different types of plants shows wide variation, legumes showing especially high values (7).

In practice deficiency of the element has occurred mainly on soils of low fertility, especially poor acid soils, and almost wholly in legumes, in which plants the deficiency may be primarily concerned with the nitrogen fixing capacity of the nodule organisms (8). The element may also be of special importance for Cauliflower and Broccoli (9). Among the trace elements, molybdenum is exceptional in that its availability is increased by liming.

In concluding this brief summary of the conditions associated with the various deficiencies two general points may be made.

Firstly, it should be pointed out that deficiencies may occur in a crop either as single (i.e. simple) or as multiple (i.e. two or more occur simultaneously) deficiencies. Secondly, it should be noted that pH is often a critical factor in causing deficiencies, particularly of trace elements, by affecting availability in the soil, and in this connection the special conditions of mineral nutrition which arise from soil acidity are later discussed in more detail.

EXCESSES

Excesses of mineral nutrients and of other metallic compounds in soils may arise from a number of causes of which the following are important in practice.

1. Mineral deposits occurring naturally, e.g. copper, zinc and manganese.

2. Streams and irrigation waters. The former may carry compounds from natural deposits or contaminants from industrial effluents. By the constant use of irrigation waters containing relatively small concentrations of mineral matter, toxic concentrations may eventually be accumulated in soils, *e.g.* boron in certain areas in California.
3. Soil acidity. This results in high concentrations of manganese and aluminium as a general rule, and may also increase the availability of other metallic ions which may be present in toxic proportions *e.g.* copper and zinc.
4. Excessive applications of fertilizers and especially of fertilizers containing one particular nutrient. Common examples are chlorine (as chloride) and boron which usually produce direct toxic effects. Other elements applied in excess may exercise toxic effects by inducing other deficiencies. Examples of these effects have been given previously, but the following may be cited as arising in practice from fertilizer applications. Potassium inducing magnesium deficiency; nitrogen inducing potassium deficiency; phosphorus inducing deficiencies of potassium, iron and zinc; sodium and magnesium inducing calcium deficiency.

SOIL ACIDITY COMPLEX

In strongly acid soils the acid conditions are associated with deficiencies and excesses of a number of mineral nutrients (10).

The acid conditions, in the first place, result from the replacement from the soil colloids (*i.e.* clay and humus) of the basic kations calcium, magnesium, potassium and sodium by hydrogen ions and the subsequent leaching from the soil of the former. As the replacement and leaching processes progress the solubility of iron, manganese and aluminium compounds in the soil are greatly increased and the respective kations of these become increasingly available to plants and eventually may reach toxic concentrations, particularly the two latter. The resultant conditions in the soil with regard to the effect on the nutrition of plants are as follows:

1. The basic kations, calcium, magnesium, potassium and sodium, may all be at deficiency levels.
2. Nitrogen and phosphorus may also be deficient, the former through lack of bacterial action and the latter by "fixation" in unavailable forms by combination with iron and aluminium.
3. Hydrogen ions, manganese and aluminium occur at toxic levels.

Hence crops on acid soils may suffer from malnutrition due to the complex interaction of deficiencies under 1 and 2 and toxic effects from 3. Different plants react differently to these conditions: thus Potatoes suffer most from calcium deficiency, Cauliflowers from manganese toxicity and Sugar Beet from aluminium toxicity.

The following example shows how the various deficiency and toxicity conditions were affected by liming and fertilizer treatments on a Potato crop growing on a strongly acid "heath" soil.

TABLE III •

SHOWING THE EFFECT OF LIMING AND FERTILIZER TREATMENTS ON MINERAL STATUS OF POTATO PLANTS ON A STRONGLY ACID SOIL

Ground Limestone Treatments 1944	3 tons Lime ½ on Surface ½ Under	3 Nil	4-Mg	-Mg 4-N	5-P	-P 3-Mg	4 Nil	-N 3+Mn	3 Nil
	No Lime	3 Nil	-Ca 4-Mg +Mn	-Ca 4-Mg	3-P	2-P	-Ca 3-K* +Mn	-Ca 3-K* +Mn	-Ca 3-Mg
	3 tons Lime on Surface	2 Nil	4-Mg	-Mg 4-N	-P 3-Mg	-Mg 3-P	4-K*	3-K*	3 Nil
	3 tons Lime Ploughed Under	1 Nil	-Mg 5+Mn	4-Mg	-Mg? 4-P	3-P	4-K	3-K	3 Nil
	No Lime	1 Nil	-Ca 2-Mg +Mn	-Mg 1-N	-Ca 2-P +Mn	-Ca 1-P? -Mg	-K* 3+Mn -Mg	2-K	1-K*
	9 tons Lime ½ on Surface ½ Under	1 Nil	4-Mg	3-Mg	-P 3-Mg	2-Mg	2-K*	2-K*	2-K*
	9 tons Lime on Surface	2 Nil	6-Mg	5-Mg	3-P	-P 4-Mg -N	4-K	2-K*	1-Mg
	No Lime	-Ca 1-Mg	3-Mg	2-Mg	-Ca 1-P	-Ca 1-P	-Ca 3-K -Mg +Mn	Failure	-K 1+Mn
	9 tons Lime Ploughed Under	2-Mg	6-Mg	5-Mg	4-Mg -P	-Mg 3-P	4-K*	2-K	1-K*
	No Lime	1-Ca	-Ca 2-Mg +Mn	-Ca 2-Mg +Mn	-Ca 3+Mn	-Ca 2-Mg +Mn	-K* 3+Mn	-K 3+Mn	-K* 1+Mn
		Nil	N.P.K.	P.K.	N.K.	K.	N.P.	P.	Nil
	Fertilizer Treatments.								

Fertiliser Treatments: N : Nitrogen—Sulphate of Ammonia 3 cwt. per acre.

P : Phosphate—Superphosphate 5 " " "

K : Potash—Muriate of Potash 2½ " " "

NOTE.—Vigour marking (maximum 10) shown on left centre of each square; deficiency or toxicity symptoms on right: (— = deficiency, + = toxicity); * following visual marking denotes no leaf symptoms but deficiency suspected from growth habit.

* Table reproduced from *Ann. Report Long Ashton Res. Stn.*, 1946, p. 62.

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NEW AND NOTEWORTHY PLANTS

Embothrium lanceolatum 'Norquince Valley Form'

WHEN arrangements were made by a small group of friends in the year 1925 to invite MR. HAROLD F. COMBER to undertake on their behalf a plant collecting expedition to South America, it was his and their special object to collect the hardiest possible forms of those plants that were known to be of doubtful hardiness in this country. The achievement of this object was perhaps most marked in plants raised from seed of *Embothrium lanceolatum*. There were previously in this country, introduced by WILLIAM LOBB in 1846, two forms—the round-leaved form, not too hardy, and the long-leaved form, hardier but not quite hardy in most English gardens.

From MR. COMBER's seed were raised several forms—some of them practically deciduous—but they had this in common—that they were much more hardy than the forms we had had before—indeed, I recollect no significant damage when they were subjected to 34° of frost while still young plants, and standing quite in the open.

Among those that I raised there was one, collected, I understand, from a plant growing in the Norquince Valley, which bears its flowers with surpassing abundance.

On most forms the flowers are in scarlet tufts from leafy shoots spread at intervals along the branches—on this particular form, however, the shoots touch one another and the whole branch is clad in scarlet. In fact, it looks as if the tree had donned a number of scarlet "Plus Fours."

The branch of the plant that received the F.C.C. was, as it happened, somewhat past its best when shown, but the fact that the plant received, in spite of this, that coveted honour, speaks much for its beauty when the flowers are at their zenith.

The seeds from which this plant was raised were numbered 387, and reached me with seeds of the Pulmari form—not quite so good.

The Norquince form, MR. HAROLD COMBER tells me, was collected at about 5,000 feet on a mountain side of the valley west of Pulmari, during a cold autumn at the end of which the collectors were driven out by deep snow. (Fig. 139.)

ABERCONWAY

Cypripedium 'Clair de Lune' var. 'Edgard Van Belle'

During the years 1927-28 we flowered in our Bruges Nursery some hundreds of the cross of *Cypripedium* 'Emerald' with 'Alma Gevaert.' The name chosen for this cross seemed and still seems to us very appropriate.

All were very pretty, of considerable value as cut-flower Orchids. Quantities were sold, but fortunately the one best and outstanding variety among all those hundreds was not sold until we had seen the flower.

It was then named after the grower in charge of the Seedling Department. In the course of time he was able by division to multiply the stock. Moreover, it is the most vigorous grower of all that were raised. The large richly green and pale green mottled leaves make of the plant a decorative object, even when not in flower. (Fig. 153.)

As in many other instances this is proof that in any cross made there may be, sometimes is, just one plant which is an outstanding Orchid.

A second good 'Clair de Lune' is 'Comtesse de Kerchove' which we first exhibited at the Ghent Quinquennial Exhibition. This, as also many other forms, lacks the stamina and vigour of the 'Edgard Van Belle' variety, nor are they comparable as regards size and beauty of their flowers.

The species used in the production of this *Cypripedium* are the albino forms of *callosum*, *Lawrenceanum* and *Curtisii*.

F. K. SANDER

NOTES FROM FELLOWS

Orphanidesia gaultherioides

I WAS delighted to see MISS SNELLING's beautiful picture of *Orphanidesia gaultherioides* in the recently published number of CURTIS's *Botanical Magazine* (vol. CLXV, part II, N.S. t. 14). For although I was with EDWARD BALLS, in the mountains south of the little Black Sea ports of Off and Rizeh in the N.E. Asia Minor, when we obtained seed of this very attractive Ericaceous plant, I had never seen it in flower, nor any figure of it. Indeed, we were very fortunate in finding it at all, and would certainly not have done so had not BALLS known fairly accurately where we ought to look for it, and what it might be expected to look like when found.

We were out to rediscover a plant with the habit and appearance of *Epigaea repens*, growing under cover of *Rhododendron ponticum* and *Vaccinium Arctostaphylos*—much larger members of the same family. Moreover, in the wet climate of this region, this local Bilberry grew, in places, as much as 5 or 6 feet high, so that we were sometimes able to gather and eat its pleasant fruit without dismounting from our horses! Thus the plant that we were looking for was by no means obvious.

It was only after long and industrious search that, with a shout of triumph, one of the party discovered what looked very like an *Epigaea*.

Later, among the debris on the ground, we came across a withered and dried-up corolla. And this was of the open bowl shape which, without doubt, proclaimed the plant to belong to the monotypic genus *Orphanidesia*.

But, alas! the seed was all shed. No, not quite all; for eventually a few seed capsules still containing seed came to light. The subsequent seed distribution of this species was of necessity a very meagre one, but resulted, nevertheless, in the beautiful flower picture and article above mentioned. The date of our search was August 8, 1934.

Anyone visiting the district south of Off and Rizeh during the late Autumn would have a better chance than we had of obtaining, in reasonable quantity, seed of this desirable plant.

An article by E. K. BALLS, entitled "Some Plant Introductions especially suited to California Gardens," appears in the July 1948 number (vol. IX, no. 3) of the *Journal of the California Horticultural Society*. In it MR. BALLS describes the rediscovery of *Orphanidesia gaultherioides*. He writes:—

"We did not see the flowers. The flower buds were first showing pink and white tips, but not one was open; and we were unable to camp on the spot to wait for them. Carefully we collected, packed and dispatched rooted pieces, in the hope that some would survive; but none did so. Hunting through tangles of the dense growth of the shrubs, we did find a few capsules of the previous year's seed, from which at least two gardens in Great Britain raised plants."

The late DR. FRED STOKER illustrated his article on *Orphanidesia gaultherioides* (in the July 1940 number of the R.H.S. JOURNAL) by a photograph of the plant flowering in his garden (Fig. 56.) He also reproduced (Fig. 55) G. DIECK's drawing from "*Gartenflora*" 40. 469 (1891), which is misleading in its floral details, and was evidently reconstructed from herbarium material and a dried-up corolla.

Balansa found the plant, in fruit, in July 1866, near where BALLS and I found it in August 1934.

DR. STOKER, after examining living flowers in his own garden, was critical of BOISSIER's separation of the Genus *Orphanidesia* from *Epigaea*, in 1875, on the evidence of an old and shrivelled corolla. There may, of course, be sufficient grounds for separating *Orphanidesia* from *Epigaea* even if the one quoted by BOISSIER has been proved subsequently to be unsound.

W. BALFOUR GOURLAY

Pleione Pricei Rolfe

The re-introduction of this Orchid has roused renewed interest in its cultivation. It was first introduced by MESSRS. W. R. PRICE and H. J. ELWES in 1914 from their joint expedition to Formosa. Aptly enough, it was MR. PRICE who also obtained the R.H.S. Award of Merit when he exhibited a well-grown specimen before the Orchid Committee on March 23, 1920 (R.H.S. JOURNAL, 44. 156). An excellent illustration of this exhibit may be found in *Gard. Chron.*, ser. III, lxvii, 183.

There has always been some doubt as to whether this is a new species

as described in *Bot. Mag.* (t. 8729, 1917); differences are noted here between *P. formosanum* and *P. Pricei*, but later, in 1925, N. MAKUYAKI, of the University Botanic Gardens, Tokyo, failed to find any differences between any of the many specimens sent to him from Formosa, and came to the conclusion that the name *P. formosanum* Hayata should take precedence (*Gard. Chron.*, ser. III, lxxvii, 393), 1925. Whatever the name, it is a most attractive Orchid and the main object of these notes is to bring to the attention of plant lovers the comparative hardness of this plant. In favourable districts it can be grown in the open in peaty, leafy soils with plenty of grit and good drainage. I know of at least one place where it has come through two successive winters without damage. The alpine house or a cold frame gives it that extra protection which will enable the plant to develop its flowers more prolifically and without blemish. The cool condition defers the flowering period for some weeks; they are more likely to come in June or July than in March, their normal time when grown in heat. *P. Pricei* forms dark olive-green pseudobulbs from the base of which spring the flowering spikes with solitary, large flowers some 4 inches in diameter. The colour of the petals and sepals is purplish, nearest to H.C.C. 31/1, and the convolute lip from white to pale orchid purple (H.C.C. 31/3). The wide-spreading lip is deeply fringed and prettily marked with brown; the prominent keels are yellow. The scape rises to some 6-7 inches when fully developed; the lanceolate leaves quickly follow the fading flowers and when fully grown will attain to some 10 inches and about 2 inches in width. The specimen illustrated was exhibited at the R.H.S. Meeting on April 13, 1948, to draw attention to the possibilities of growing this species in the open with the protection of a cloche or piece of glass through the winter months. (Fig. 150.)

J. T. WALL
Supt., Alpine Dept.
R.H.S. Gardens, Wisley

A hybrid Geranium

A few years ago there occurred here among a colony of seedlings of *Geranium pratense* a hybrid, the pollen parent being *G. grandiflorum* of a strain selected for colour and size of flower, as was that of the seed parent. This hybrid has proved an excellent border plant. A vigorous grower, intermediate in general characters with the two species responsible for it, it raises a broad sheaf of slender tangled stems, needing slight support, and, coming into flower a month earlier than the typical *G. pratense*, that is in early June, continues for about six weeks, the individual flowers, being sterile, lasting unusually long. These flowers, opening nearly flat, may be as much as 2½ inches across. They are borne in prodigal profusion, owing to the number and free branching of the stems, and in colour they are a lovely blue. They are, indeed, a purer blue than those of any other *Geranium* I have grown—a refined harebell-blue—always excepting *G. Wallichianum* Buxton's Variety.

A. T. JOHNSON

SOME OBSERVATIONS ON REVIEWS

IN MR. J. WILSON'S review of the "The A.B.C. of Flower Growing" by W. E. SHEWELL-COOPER (R.H.S. JOURNAL, June 1948), the reviewer warns us that to bury coal ashes where Lilies are to be planted is unsound advice. This may be true. But what about wood ashes? Some of us who have seen Lilies growing wild have noticed that several species, e.g. *L. Wallichianum*, *L. nepalense*, *L. ochraceum* var. *burmanicum* and the "Sirhoi" *Nomocharis*, to mention a few, grow well and seem to increase in savannah or pasture which is periodically burnt over. In the mountains of Assam, Burma and elsewhere, agriculture is invariably associated with annual or periodic burnings, and where grazing ground for cattle is required, considerable areas of pine-oak parkland with bracken or tall grass or, at higher altitudes, low grazing vegetation prevails, as a pre-fire climax. And it is just in such places that Lilies of several species abound. I commend this point to Lily lovers.

While on the subject of reviews in the JOURNAL, is it not time that reviewers were a little more reasonable, or even charitable, about carping at misprints? One gets the impression that the experts (in horticulture—not criticism) are so anxious to find blemishes that the reviews become lop-sided. We all know that misprints in a book are deplorable. But in these austere days, with less of everything, including hard-worked printers' readers, space and time and, above all, food, it might be taken for granted that writers, printers' readers and proof-readers, like other people, make more mistakes than in pre-war days. I am all in favour of reviewers saying what they think—one of the nicest things about the JOURNAL is that reviewers *can* say what they think without having to consider advertisement revenue. But they could without prejudice maintain a sense of proportion.

F. KINGDON-WARD

Imphal, Manipur State, Assam

QUEST FOR LARIX LYALLII

Edith Hardin English

THE sight of venerable trees, gnarled and knotted by many rigorous seasons, rarely fails to arouse in us an attitude of deference. There they have stood, high on the mountainside, year in and year out, century in and century out, subjected to untold tortures of icy winds, with even their precarious footholds threatened by every alternate freeze and thaw. Yet their forms, like staunch personalities racked by years of pain, are handsome with strength and defiance. Such were my thoughts as I stood on the wind-swept brink overlooking the great Lyman Glacier in north central Washington, admiring silently the rugged stalwartness of a particularly well-developed old specimen of *Larix Lyallii*. (Fig. 148)

It was my desire, after having seen trees of this species in the precipitous region of Mt. Stuart, to visit other areas of their limited range

and if possible to obtain a series of photographs showing their characteristics at various ages. It happened to be my husband's desire also to visit their habitat in order to bring back a few small seedling trees of this kind for the purpose of testing their horticultural possibilities.

Larix Lyallii, a true alpine and one of North America's relatively rare conifers, grows at such high altitudes and so far off the commonly travelled highways that the most practical manner of reaching it is on foot, even though this entails many strenuous miles of travel.

We laid our plans for a trip into the region of Lyman Glacier to be taken in July, this being the earliest time at which the snow would be sufficiently melted to allow us to accomplish our purpose. According to our custom we drove our car as far as possible up a treacherous, narrow, mountain road and then shouldering our packs, which included sleeping bags, food, first-aid kits, cameras and collecting equipment, we struck merrily off up the canyon on foot.

Offering at first only dense underbrush, eventually the narrow canyon opened out into little benches upon which *Mimulus Lewisii* presented striking rose splashes and occasionally its more delicate colour form, *M. Lewisii*, forma *leuceruthrus*, one of my own botanical children, softened the picture with its shell-pink display. In other spots it was the bright gold of *Mimulus guttatus* that bordered the swift water. In the drier locations *Spiraea lucida* flourished.

As we progressed, gaining elevation rapidly, the flora took on more and more characteristics of the Canadian life zone. *Mertensia paniculata*, with its dainty blue and pink bells, formed such lush growth in the open meadows that it greatly impeded our progress. Eventually we found ourselves in the truly subalpine meadows where the large, creamy blossoms of *Anemone occidentalis*, the Western Windflower, took possession of the landscape. (Fig. 149.)

The pronounced U-shape of the valley up which we were now travelling told us that within relatively recent times, geologically speaking, a great glacier had scoured and gouged its way down this canyon as smoothly as a giant shovel might have done. Now the stately subalpine firs, *Abies lasiocarpa*, followed and accented the gently rounded slopes of the valley. Above us still hung remnants of glacial snowfields which sent cold, dashing streams down to join the larger one which flowed through the valley floor.

Late in the afternoon we were approaching the headwaters of the stream and immediately before us rose the 9,000-foot crest of the ragged, precipitous Chelan Range. Our hopes were to gain the opposite side of this range before darkness overtook us. Pausing only long enough to fortify ourselves with some warm, nourishing food, we began the ascent.

It was during the last thousand feet that we encountered a strong, cold wind that threatened to tear us from our footing. While I sought shelter behind a huge boulder, my husband climbed on up to the knife-edged summit to determine whether or not we could descend on the other side from this point of attack. Looking down through a V-shaped notch he decided without any hesitation that we certainly could not. The range dropped off a sheer thousand feet or more! On along the

crest he went, peering down from one notch after another, finally locating a steep but negotiable rock slide with a snow-slope immediately below which would offer safe footing. It was down this route that we carefully worked our way. By the time we reached the lower end of the snow-slope it was almost dark, the last part of our descent being accomplished as much by feeling as by seeing.

Below the snow-slope was a small bench where three or four very dwarfed and matted trees of *Pinus albicaulis*, the white-barked pine, provided a meagre windbreak. Here we decided to make camp for the night, at approximately 7,000 feet elevation. A small fire of dry, dead twigs from the white-barked pine melted enough snow for a steaming gelatin drink and warmed a hot rock apiece to place inside our sleeping bags. Strange as it may seem, we slept soundly and warmly.

It was the next morning while gathering twigs for a breakfast fire that we beheld, down on the next bench below us, the object of our quest. There against the dazzling whiteness of a snow-field was a grand old specimen of *Larix Lyallii*, and standing near it, as if in filial admiration, were several young trees, one and all showing unquestionably the effect of the prevailing winds in shaping their one-sided forms.

In addition several very interesting alpine plants were found at this location, including: an attractive form of *Dryas octopetala*; *Empetrum nigrum*, the low, creeping Crowberry; *Phyllodoce glanduliflora*, known locally as yellow heather; *Lupinus Lyallii*, a handsome little Lupin with soft, silvery foliage and blue-violet blossoms; *Penstemon Tolmiei*, noted for its exquisite fragrance; *P. Menziesii*, a typical rock lover which offers a profusion of large, violet-coloured flowers; *Saxifraga Tolmiei*, a tiny, fleshy-leaved, white-flowered rock breaker that likes to dabble its feet in icy, running water; *Ledum glandulosum*, a relative of the Labrador Tea; *Eriogonum ovalifolium*, with white-tomentose foliage; *E. pyrolae-folium*, var. *coryphaeum*, with rose-coloured flowers; *Erigeron trifidus*, a small Mountain Daisy, and its ever desirable little relative, *E. aureus*, the golden flowers and long blooming period of which make it one of the most attractive of western American alpines.

By mid-morning we could look down over the brink of the canyon and see Lyman Glacier, a huge, dome-shaped mass of ice that snuggles firmly into the great elbow formed by the meeting of the Cascade and the Chelan Mountain Ranges. Below the glacier, drinking up the icy water as it melted, was picturesque Upper Lyman Lake and a short distance down from there, Lower Lyman Lake. In the valley, near the snout of the glacier, we could begin to make out the weathered shapes of other trees of *Larix Lyallii*. But before we could reach them it was necessary to thread our way painstakingly down the canyon wall, at times sliding out of all control on the dry slopes of *Phyllodoce empetri-formis*, at others clinging with all the tenacity we could muster to obligingly offered roots of *Abies lasiocarpa*.

Finally the valley floor was reached and base camp established in a clump of subalpine Firs near the upper lake. The following morning I made a brief survey of the glacial moraine to discover what plants might be growing there and then continued my work of photographing the alpine Larch.

Meanwhile my husband was climbing the inhospitable-looking cliffs on the opposite side of the canyon, fraternizing with the wild mountain goats in negotiating the higher peaks beyond, in search of rare little species of *Draba* and other new or interesting alpine. That night he had thrilling tales to relate of how he finally refused to follow further in the footsteps of a particular goat he had been trailing. With nonchalance known only to the sure-footed *Oreamnos* and his kind, the creature had leaped off a thirty-foot cliff, landing with keen precision and apparent unconcern on a steep, slippery snow-slope below. To have failed in the landing would have meant a death-dealing fall of several hundred feet. Seeking a safer though more round-about route my husband had succeeded in his search for rare plant treasures.

And now from his air-tight collecting cans he brought forth a gratifying assortment of unusual alpine. Included were four especially lovely little species of the genus he particularly wanted, *Draba incerta*, *D. andina*, *D. ruaxes* and *D. lonchocarpa*. In addition he had collected plants of: *Salix cascadiensis* and *S. nivalis*, both very attractive, miniature, alpine Willows; *Anemone Drummondii*, a dainty little member of this genus; *Pedicularis ornithorhynca*, the rose-coloured Duck-bill; *Gentiana calycosa*, a lover of the moist meadows; *Saxifraga oppositifolia* which forms lovely pink-flowered mats on high alpine rock walls; *Cassiope Stelleriana*, the handsome, trailing Alaska Heather (Fig. 151); *Smelowskia americana*, with lovely, grey-green foliage and white or lightly violet-tinted flowers that resemble *Alyssum*; *Dodecatheon Jeffreyi*, a robust, water-loving Shooting Star; *Epilobium latifolium*, an alpine Fireweed; *Lloydia serotina*, a delicate, liliaceous plant with grass-like foliage; *Silene acaulis* var. *exscapa* that forms bright green cushions studded with pink blossoms; *Phlox condensata*, also a low cushion plant, and most pleasing of all, another collection of a new and dainty little *Campanula* which he had discovered on another peak in the Cascades the year before.

My day also had been full of adventurous thrills. I had a generous stack of botanical specimens to offer and an extravagance of exposed films that I hoped would mean passable pictures. Best of all, I felt that at last I had realized my ambition to study *Larix Lyallii* in its native habitat.

Within surprisingly few feet of the glacier stood the largest specimen of this Larch that I have yet seen. At the base the trunk measures approximately two and a half feet in diameter, narrowing a short distance from the ground to about two feet. Its life span, no doubt, numbers 500 to 700 years. Throughout the ages its withy branches have whipped in the merciless winds and its trunk has been buried deep by many a winter's snow, yet it is an object of uncommon beauty. With seeming spirit of homage, the mighty Lyman Glacier has deposited moraine material, like veritable offerings, within a few feet of the base, yet not a stone has marred its perfection.

Examining closely the characters of the alpine Larch, I noted that mature trees reach a height of about thirty-five or forty feet, the bark being rich purplish brown and attractively, though not deeply, patterned. Many of the branches are long, swinging or whipping continuously in the wind, thereby complicating matters for the

photographer. The crown of older trees is open and lacking in pyramidal symmetry. Younger trees exhibit a somewhat broadly pointed crown and those with a trunk diameter up to five or six inches are slender and spindling with smooth, unbroken, grey bark.

One of the distinguishing characteristics of this tree which serves to separate it taxonomically from our more common *L. occidentalis*, the western Larch, is the occurrence of a white, woolly pubescence on the young shoots. This has led to the term, "woolly Larch," being applied occasionally to *L. Lyallii*.

The cones measure four to five centimetres in length, are of a deep reddish purple colour and are abundantly supplied with long, bristly bracts that project beyond the cone scales. On this particular year the cones had not been produced in any abundance and it was with some difficulty that I located a sufficient number for botanical specimens.

The delicate, light bluish green needles, arranged in clusters of about forty, add greatly to the distinctive appearance of the tree. We commonly think of conifer trees as holding their needles throughout the year but the genus *Larix* is a notable exception. This habit of dropping its needles in the autumn is one of the secrets of the ability of the alpine Larch to endure the severe weather conditions to which it is subjected. Rather than battering against the tree, the wind whistles through its branches. Being strong and sinewy they bend rather than break.

In autumn, just as the needles are turning colour, every Larch tree reveals its presence by its glorious wealth of deep orange gold that stands out so strikingly against the arctic-alpine landscape.

The range of *L. Lyallii* is known to include parts of Alberta, British Columbia, Washington, Idaho and Montana, but being a timberline tree it occurs only in certain limited high mountains of these regions. A reported record from Mt. Hood, in Oregon, has proved very doubtful as diligent botanical search on all sides of the mountain has failed to reveal a single tree of *L. Lyallii* in that locality. However, *L. occidentalis* occurs commonly there.

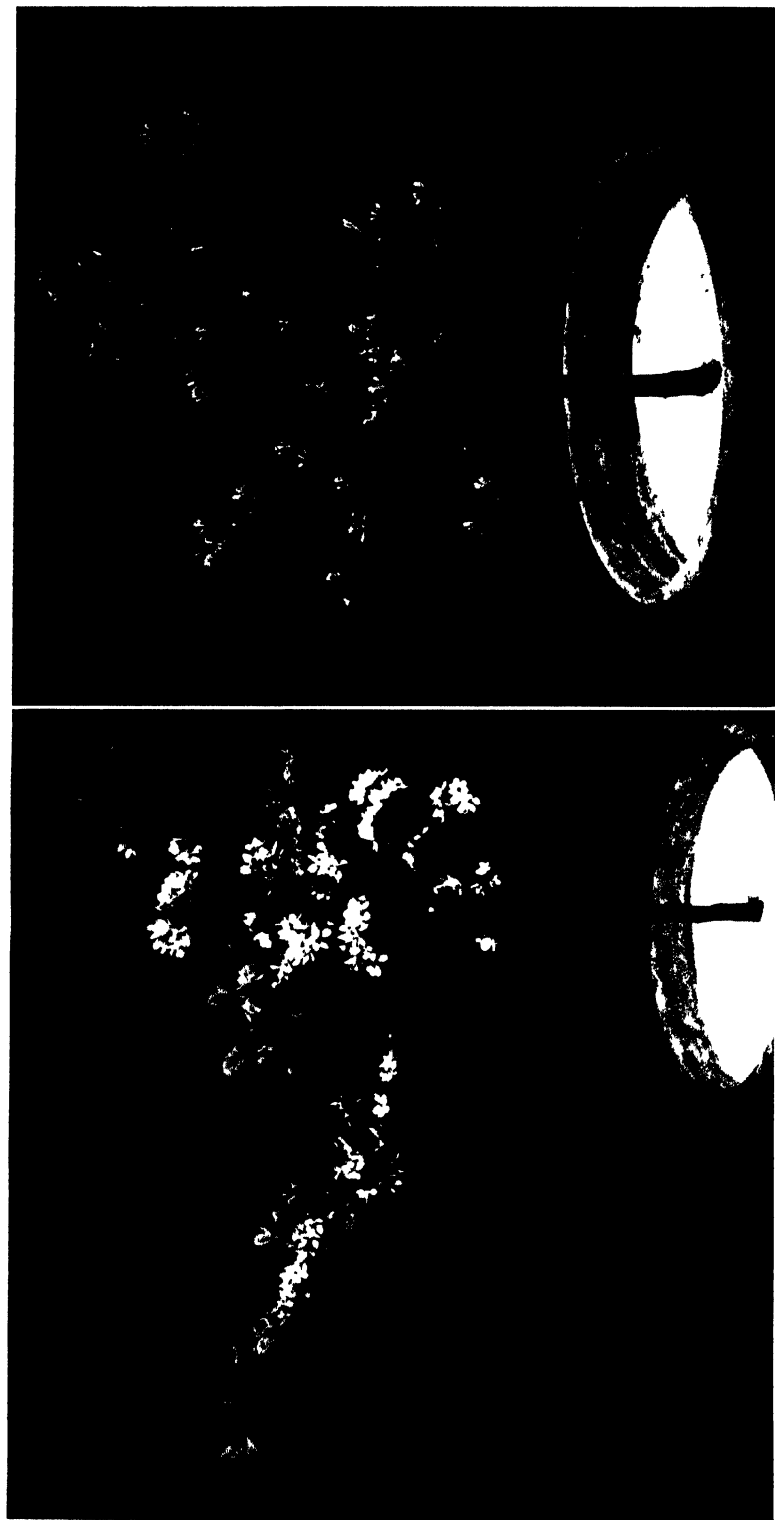
In cultivation the tiny seedlings of *L. Lyallii* are amazingly deliberate in their progress of making growth. They are planted in soil in which the acidity and the fibre content have been increased by the addition of generous amounts of peat. Remembering the ever-present trickles of ice water which ran over the alpine ground in which these little trees were growing, we give them generous amounts of water.

Considering the extremely short growing season that these trees have in their native haunts, we continue to marvel at the great size attained by the patriarch of Lyman Glacier.



FIG. 138.—Iris 'Hy Time'. Shown by H. J. Randall, Esq.,
and selected for trial at Wisley. May 25, 1948





NUTRITION PROBLEMS OF HORTICULTURAL PLANTS

FIG. 140—Apple trees—Showing the weakening effect of phosphorus deficiency on blossoming. The blossoms are also late in opening. Nitrogen deficiency has a similar effect. *Left*—receiving complete nutrient : *right*, phosphorus omitted.



FIG. 141—(top left) White Clover blossoms—Wilting of pedicels followed by death of the blossoms. One of the typical effects of calcium deficiency

FIG. 142—(top right) Soil acidity effects on Sugar Beet. *Right*, calcium deficiency producing distortion, backward curling and death of young leaves: top left, manganese toxicity causing chlorotic mottling of leaves; *bottom left*, aluminium toxicity, failure of root growth and phosphorus deficiency in leaves

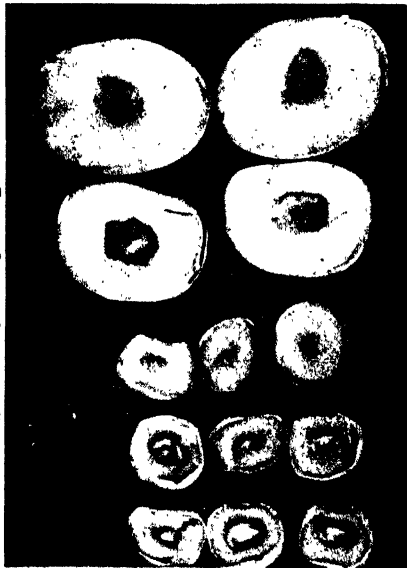


FIG. 143 — (bottom left) Pea and Bean seeds—showing typical lesions in the cotyledons due to manganese deficiency. In Peas the condition is known as 'Marsh Spot'

FIG. 144—(bottom right) Tomato fruits—malformed fruits and cracking of skin due to boron deficiency.



FIG. 145—Tomato plants—forward curling and chlorosis of leaflets due to molybdenum deficiency. Plant on extreme left has recovered following stem injection with sodium molybdate



FIG. 146—Black Currant leaf—A typical magnesium deficiency leaf pattern. The dark central portion is purple and the marginal area remains green



NUTRITION PROBLEMS OF HORTICULTURAL PLANTS

FIG. 147—Iron deficient Potato plants receiving different levels of potassium: *left*, high K ; *centre*, low K ; *right*, medium K. High level of K decreases the effects of iron deficiency and lessens chlorosis of tip growths



Photo, Edith H. English]

THE QUEST FOR *LARIX LYALLII*

FIG 148—*Larix Lyallii* near Lyman Glacier, Washington (See p. 384)



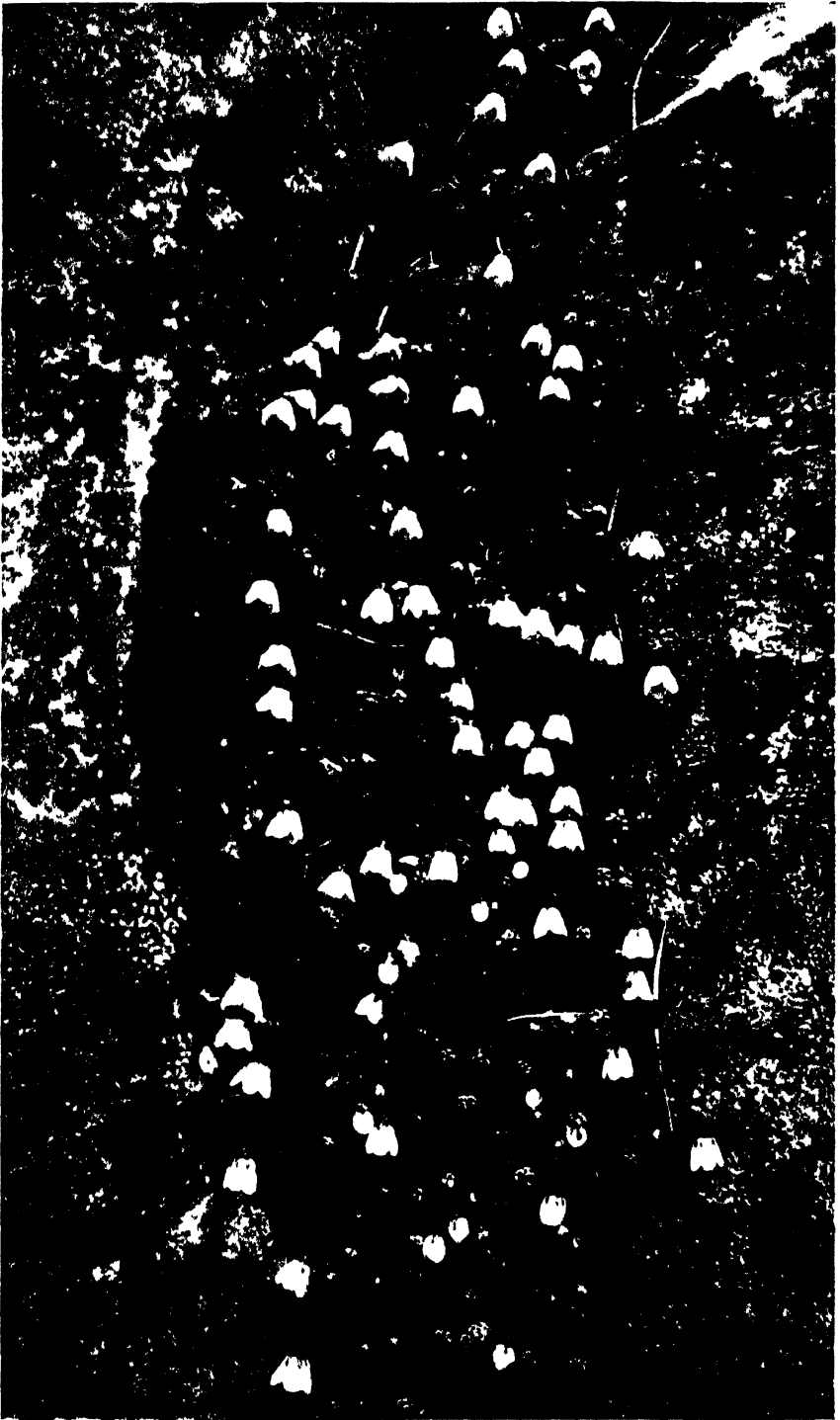
THE QUEST FOR *LARIX LYALLII*

FIG. 149—*Anemone occidentalis* the Western Windflower (See p 385)



Photo, R. A. Malby]

FIG 150—*Pleione Pricei* Rolfe (See p 382)



Photo, Carl S. English, Jr.]

THE QUEST FOR *LARIX LYALLII*

FIG. 151—*Cassiope Stelleriana* the Alaska Heather (See p. 387)

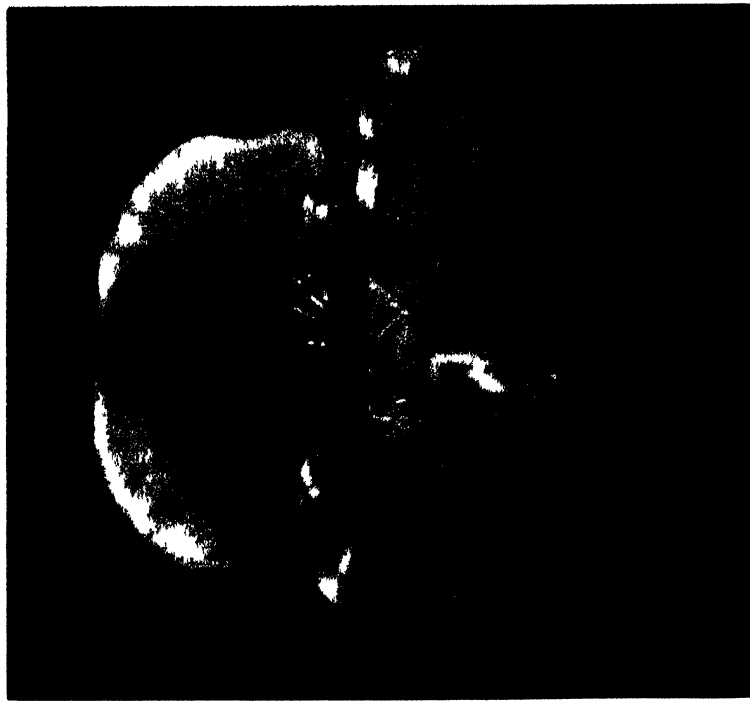


Photo and flowers lent by N. M. Jensen, Esq.]

FIG. 152—*Cyprripedium* 'Banchory' 'Duke's Edge' variety Award of Merit and George Moore Medal R.H.S. 1947, raised and shown by N. M. Jensen, Esq.
The parents of this fine *Cyprripedium* were 'Grace Darling' var 'Countess' × 'Dickler.' The chief feature is its fine shape and



Photo, W. F. Sedgewick Ltd.]

NOTABLE PLANTS AT CHELSEA SHOW
FIG. 153—*Cyprripedium* 'Clair de Lune' var. 'Edgard van Belle' Shown by Messrs. Sanders, St. Albans (See p. 381)

THE EFFECT OF FROST OF THE WINTER OF 1946-47 ON VEGETATION

R. L. Harrow, V.M.H.

WITH the object of obtaining information regarding the effect of the long continued spell of frost to vegetation in Britain, The Royal Horticultural Society decided to circulate among its members and others interested inquiries as to the results of damage done to plants cultivated in their gardens. The replies received from all parts of the country contained much evidence of the severity of the frosts, and its long duration and consequent damage to vegetation.

In a number of cases the temperatures fell to well below zero, records of this came from Scotland, North of England as well as from the southern and western counties.

From the Isles of Scilly a reading of 3° was lower than any previously recorded there.

With such low temperatures prevailing over a considerable time it can hardly be surprising that the effect on plants, natives of more temperate regions than our own, proved disastrous, and some can hardly be termed really hardy in Britain.

To mention only a few of the genera either killed or badly injured, the following must be included: *Cistus*, *Ceanothus*, *Eucryphia*, *Erica*, *Gordonia* and others of equal tenderness. Only two reports of *Magnolias* being killed outright were sent in, while *Embothriums* and many other valuable shrubs suffered severely.

Among our native British plants, the Common Broom, Heathers and Ling succumbed in many parts of the country. On the whole the now numerous species of *Rhododendrons*, many of which are among the more recent of introductions from China, seem to have withstood the low temperatures of 1946-47 with only slight damage, those most frequently mentioned including *R. barbatum*, *R. bullatum*, *R. campanulatum*, *R. grande*, *R. Hookeri*, *R. Griersonianum*, as being most seriously affected. At Brodick Castle, Isle of Arran, *R. Nuttallii* was killed, but *R. Taggianum* escaped injury, while at West Porlock the hybrid *R. 'Fragrantissimum'* was also uninjured. Reports on the damage done to Roses were numerous, among those killed might be mentioned *Rosa Banksiae* eighty years of age, at South Lodge, Horsham, *R. bracteata* at Burghclere, Newbury, *R. 'La Follette'* at Borde Hill, *R. 'Paul's Scarlet Climber'* at Cadmore End, High Wycombe. The Hybrid Tea Roses in some gardens also suffered badly. An unexpected record is that of *Lagerstroemia indica* which escaped injury at Wormley Bury.

In regard to Vegetables, the information obtained showed how severely treated were the Brassica family and such remarks as "Broccoli killed outright," "all vegetables lost," "Kale and Spinach destroyed," were common.

Fig trees in many gardens suffered severely, being either killed outright or the branches cut to ground level in widely distributed areas over most of the country.

FROST DAMAGE SURVEY, 1946-47

PART I

THE names of plants given in the following list are almost entirely those as given in the reports received. In a few instances, however, where the generic name has been changed and where this name is now in general use in gardens, this has been adopted. In some cases, the previously used name has been inserted also in brackets. In cases of doubt we have followed REHDER's *Manual of Trees and Shrubs* or the *Kew Handlist*, but in cases where one name is widely established and in general use in gardens, we have not always followed REHDER in the adoption of a name which is almost completely unknown among horticulturists. A special category "Z" has been introduced to record plants in the Royal Botanic Garden, Edinburgh, which were formerly grown outside but which were killed in the winter of 1940-41 and had not by 1946-47 been replaced outside. In order to save space in some genera a number of species uninjured in all gardens recorded have been placed together at the end of the genus. The first returns showed a number of observations where damage had been recorded from one garden while other gardens where it had been undamaged had not given any record of it. In order to avoid any confusion which might be occasioned by such isolated records a number of the owners of the larger collections very kindly looked through the lists a second time and added further records from their gardens so that as complete a record as possible might be obtained.

THE SEVERELY COLD WINTER OF 1946 TO 1947*

SOME NOTES FROM THE METEOROLOGICAL OFFICE

During this winter there were three cold spells. The first two were of short duration and occurred between December 15th and 21st and from January 5th to 7th. The third cold spell was the longest and most severe. It persisted for about $7\frac{1}{2}$ weeks, from the last week in January until mid-March. Shortly before the onset of this last cold spell, the weather had been unusually mild, both in this country and on the continent including Western Russia. In many places in England, the temperature reached or exceeded 55° F. on January 16th.

During all three spells pressure was highest to the east and northward and lowest to the southward of the British Isles. Such a pressure distribution in winter is favourable for very cold air from Siberia and the Arctic to move westwards over the country from the continent. In most districts easterly winds set in about January 22nd and persisted until February 22nd. This is probably the longest spell of easterly winds recorded in this country.

An interesting feature of this bleak easterly air stream was its dullness over England and Wales. At many places there, February 1947 was the duller on record. The sun was not visible at Kew from February 2nd until the 22nd. In the long cold spell, the cold air was shallow

* The Editor acknowledges with thanks the kind assistance of the Director of the Meteorological Office and his staff in compiling these notes.

and did not extend above ground to a height of more than about 4,000 feet. In such circumstances cloud sheets formed over the continent and over the North Sea do not break except locally. One consequence of these cloudy conditions was that night minimum temperatures, except locally where skies were clear, were not so remarkably low as were the day maximum temperatures. These, over a wide area, did not reach the freezing point on many occasions, notably between February 11th and 23rd. Thus the maximum temperature only reached 23° F. at Birmingham on January 29th and at Leuchers on February 23rd, 24° F. at Little Risington, 25° F. at Homiley, 26° F. at Boscombe, Devon and Waddington and 29° F. at Plymouth on February 17th. Even in the Channel Islands the highest temperature frequently did not exceed 32° F. Among the very low night minimum temperatures recorded were - 5° F. at Writtle in Essex and - 3° F. at Bodiam in Sussex on January 30th, and - 5° F. at Woburn on February 25th, - 3° F. at Luton on February 24th and at Appleby in Westmorland on February 23rd. Even in the extreme south-west of England some very low minima were recorded, *e.g.* 4° F. at Totnes, 10° F. at Exeter and 16° F. at Plymouth Hoe on February 1st, 24° F. at St. Helier's, Jersey on February 17th and 24th, and 30° F. at St. Mary's, Scilly, on February 19th.

Depressions on the Atlantic were never very distant from our south and south-west coasts. The warm maritime air associated with these depressions was frequently forced to ascend above the cold air lying over the British Isles. When such conditions occur, as they did frequently in February 1947, they are favourable for continuous precipitation in the form of snow and hail if the cold air is sufficiently deep. It is probable that the winter under discussion was the snowiest on record. Snow fell in some parts of Great Britain every day from January 22nd to March 17th. In some districts there were 26 successive days of snow. Another consequence of the cloudy skies and low day temperatures was that the snow did not melt during the day time. Indeed snow covered the greater part of Great Britain continuously from about the end of January to near the middle of March and locally later in northern areas. Over some regions in February, level snow lay to a depth of 2 feet and there were 53 inches at Forest in Teesdale, Durham on February 19th. In February the regions most affected by the snow, and where there was much drifting and serious dislocation of road and rail traffic, were the N.E. and N. Midlands, and the hills of central and northern Wales. Even Cornwall suffered much from the snow. On January 30th snow lay to a depth of 7 inches at both Scilly and the Lizard. In marked contrast the notoriously wet stations Glenquoith, Glencoe and Ardgour in the Highlands of Scotland, were rainless in February. In some districts of this region it was so dry that there were heather fires. On March 4th and 5th a severe snowstorm engulfed the Midlands, East Anglia and Wales and blocked the roads to London from the north. In the extreme south there was heavy rain and glazed frost.

Taking into account the low temperatures, snowfall, persistent east winds and lack of sunshine, the winter of 1946-7 was the most severe in this country for at least a century. In Holland it was considered to be the most severe since the terrible winter of 1788-89.

THE EFFECT OF FROST OF THE WINTER OF 1946-47

Gardens from which information has been received

	HEIGHT AE VB EA	SITUATION WITH REGARD TO SHELTER, ETC.	LOWEST TEMPERATURES		RECORD MADE BY
			IN SCREEN	ON GRASS	
	Feet				
ABERFOYLE, Craigenvoech, Perth	100	Sheltered, hilly on all sides	Below zero on N. wall		Capt. C. E. Maconochie
ABINGDON, Frilford Grange, Berks.	240	Open			J. G. Beazley, Esq.
ALBERTON, Bearnish, Wolverhampton	400	Open			Mrs. Garnet Bothfield
AMBLESIDE, High Close	550	Hills, Shelter from N., N.W. and N.E.	20 on post		F. E. T. Jones-Balme, Esq.
ANDOVER, Red Rice, Hants.	290	Open		8 (23/2/47)	Major G. E. Miller Mundy
ARDINGLY, Wakehurst Place, Sussex	440	Sheltered	Zero		Sir Henry Price
ARDMADDY CASTLE, by Oban, Argyll	St 1 Leve]	Sheltered by woods and hills	14		Mrs. J. G. Struthers
AULDGIRTH, Blackwood, Dumfries	100	Sheltered		10	T. H. Kennedy, Esq.
BASINGSTOKE, The Vyne, Hants.	220	Fairly sheltered by woods	5		C. L. Chute, Esq.
BASINGSTOKE, nr. Tunworth, Wiston Corbett Place	400	Open on hill		Zero	Conrad P. Heseltine
BATTERSEA, S.W.11, Old Battersea House	300	Sheltered by houses	Zero on post		Mrs. Stirling
BEACONSFELD, Bucks.	510-600	Open			Mrs. Edith Pepyat Evans
BEAMINSTER, Netherbury Court, Dorset	300	Hilly	6		Mrs. Blacker
BENEDEN, The Grange, Cranbrook, Kent		Sheltered by scattered trees and woodland			Capt. C. Ingram
BICESTER, Soulden, Oxon.	400	Open, sheltered on N. & E. by woods			Miss C. M. Garnett
BIDEFORD, Pillhead House, N. Devon	40	Sheltered		28	Lt.-Col. McAnsell, D.S.O.
BIGNOR, Great Orchard, Pulborough	190	Sheltered by Downs from South	25 on N. wall		Major G. B. Hill
BIGNOR PARK, Pulborough	200	Sheltered by woods and hills 2 miles S.W.			Viscountess Mersey
BINFIELD, Marchfield, Berks.	200	Sheltered by high trees and hedges			Lady Duncan
BIRSTWITH, Swarcliffe Hall, Harrogate	500	Open to E. & N.E.		5	Col. V. J. Greenwood
BLANEFIELD, Auchineden, Nr. Glasgow	800	Hills around, sheltered from N.W. wind			Miss M. Donaldson

BODNANT, Tal-y-Cafn, N. Wales	100	Open to S.W. sheltered on N.E.	12	9	Lord Aberconway
BORGAN, Warren Point, Anglesey	10	Open	24th Feb.	4	E. Duerr, Esq.
BOURTON-ON-THE-WATER, Great Risington Manor, Glos.	500	Open, chiefly on W. side	-2 23/2/47		Mrs. W. T. P. Marling
BOURTON-ON-THE-WATER, The Manor, Glos.	450	Open			I. Dalrymple, Esq.
BRADFORD-ON-AVON, Iford Manor, Wilts.	100	Sheltered by wood on N.	Zero frost		Sir Michael Peto, Bt.
BRAMLEY, Snowdenham House, Surrey	300	Sheltered	Zero 30/1/47		E. S. Wheller, Esq.
BRIANTSPUDDLE, Dorchester	200	River valley subject to strong winds W. & S.W.			Lady Debenham
BRIDGNORTH, Eversley, Salop.	200	Open to N.E.			J. D. North, Esq.
BROADWAY, Snowhill, Worcester		Open, sheltered from E.	20		Mrs. R. H. Milvain
BRODICK CASTLE, Isle of Arran	From sea level to 100 ft.	Sea on S. & S.E., sheltered by hills N.	15		Duchess of Montrose
BURGHCLERE, Newbury, Berks.	425	A semi-woodland garden			W. Bentley, Esq.
CARRADALE, Campbelltown, Argyll	10	At foot of windy glen, partly sheltered by trees			Mrs. Mitcham
CASTEL CARY, Alford House, Somerset	150	Open		9	Mrs. B. M. Thring
CASTLE DOUGLAS, Crofts, Kirkcudbrightshire	700	Open, sheltered by woods and hills	28		Mrs. B. J. McQueen
CHAGFORD, Teignworthy, Devon	1,000	On edge of Dartmoor, open to S. exposed to prevailing winds. Reservoir about 1 mile to S.W.			Major E. A. Courthorpe
CHARD, Forde Abbey	200	In valley of Axe on gentle slope N.	28		G. D. Roper, Esq.
CHIDDINGFOLD, Ramster, Surrey	300-400	Sheltered by woods and trees. Lake, ponds and many springs			Hon. Lady Norman
CHIPPING CAMPDEN, Paxford Manor, Glos.	350	Partly sheltered	29 on E. wall 2 ft. above ground		Major-Gen. J. A. Aizleworth
CHRISTCHURCH, Thorney Hill	150	Partial shelter from trees			L. E. Hay, Esq.
CHRISTCHURCH, Winkton		Slight shelter from hills S.W.			Mrs. R. Lake
CIRENCESTER, Driffield Manor, Glos.	200	Open			Lady Ingram
CLAVERTON, Ludstone Hall, nr. Wolverhampton	245	Sheltered by hills	-2 on post		Melvyn Rollason, Esq.
COLDSTREAM, Springfield, Berwickshire	100	Open, sheltered from N.	32		Lord Dunglass

THE EFFECT OF FROST OF THE WINTER OF 1946-47—continued.

Gardens from which information has been received

LOCALITY	HEIGHT ABOVE SEA	SITUATION WITH REGARD TO SHELTER, ETC.	LOWEST TEMPERATURES		RECORDS MADE BY
			IN SCREEN	ON GRASS	
CONNEL, Ardchattan Priory, Argyll	Feet Sea Level	Partly sheltered			Lt.-Col. R. Campbell Preston
CRATHES CASTLE, Crathes, Kincardine	200	Wooded country, hills 2 miles S.	23		Sir James Burnett of Leys
CUCKFIELD, Borde Hill, Sussex	300-500	Various aspects			Col. Stephenson Clarke
DALBEATTIE, Drumstane Hall, Kirkcudbrightshire	400	Open, Solway Firth 2 miles			Capt. R. F. Hanbury
DANS, Manderston, Berwickshire	350	Open		3 (4/3/47)	Major Baile
DEAL, Northbourne Court, E. Kent	75	Fairly sheltered. Rising ground with trees 3 miles to sea		12	Lord Northbourne
DORCHESTER, Cerne Abbey	800	Hill on E. & W. Small lakes with running streams	22		Lord Digby
DORCHESTER, Bingham's, Melcombe	200	Sheltered by hill, exposed to E.		25 (29/1/47)	Lady Grogan
DUNCHIDOCK, Haldon Grange, Exeter	450	Sheltered by trees			Neville Randall, Esq.
DUNS, Kinnerghame, Berwickshire	260			-8 (3/3/47)	Brig. A. H. C. Swinton
DUNSTER, Somerset, Castle Gardens	100	Sheltered by trees	15 (23/2/47)		S. Hardwick, Gardener
EAST PECKHAM, Roydon Hall	150-200	Open, hill to N.N.E.		16	A. R. Cook, Esq.
EDINBURGH, Sydney Lodge	300	Open		23	Mrs. G. F. Dalziel
EDINBURGH, Royal Botanic Gardens (abbreviated R.B.G.E.)	48-109	Open to the W. built up to N., S. & E.	11 (4/3/47)	1 (23/2/47)	Dr. J. Macqueen Cowan
FALMOUTH, The White Cottage					Miss M. C. Spring
FARNHAM, Court Croadall, Hants.	340	Open, trees to N.E.	8 (29/1/47)		G. Beddington, Esq.
FITCHAMSTAD, Ridgeland House, Berks.	350	Sheltered by hilly woodland			W. Hutchinson, Esq.
FORDWICH, Tancrey, Nr. Canterbury	Approx. sea level	Sheltered by low hills, N. & S.			Stephen Williamson, Esq.
FORFAR, Inshewan, Forfarshire	250-300	Very sheltered		14	John B. D. Ogilvy, Esq.
FORRES, Sanquhar, Morayshire	100	Open, sheltered by woods	Zero		Mrs. Charles Edward

GATEHOUSE OF FLEET, Ardwell, Kirkcudbrightshire .	20	Sea within 100 yards	25	Major-Gen. Sir Andrew McCulloch
GLENCARBE, Glendock, Perthshire .	40	Sheltered by hills, N.	8 (20/1/47)	E. H. M. Cox, Esq.
GODALMING, Hascombe Court .	420	Open	11 (24/2/47)	Sir John Jarvis, Bt., M.P.
GORING-BY-SEA, Highdown .	100	Open to South Downs, partly sheltered, 1 mile from sea	Zero	Colonel F. C. Stern
GODHURST, Latham House, Kent	400	Moderately sheltered	39 on post	Sir George Jessel, Bt.
GREAT AMWELL, The Cottage, Ware, Herts.	120	Open, large expanse of water near	1 on post	Miss C. Beck
GREAT CHALFIELD, Melksham, Wilts.	165	Open, in hollow frost pocket	34	Major R. F. Fuller
GREENLAW, Eccles, Berwickshire .	220	Sheltered by trees	2 ft. above ground	D. G. Greig, Esq.
HAWKHURST, Delmonden Manor, Kent .	250	Sheltered on E., River Mersey 2 miles	8 (24/2/47)	Dr. M. Ansler
HANDCROSS, Sussex	300-400	Open	5	Colonel J. R. Warren
HELSEY, Heathercliffe, Nr. Warrington .	80	Fairly open	12 on wall	F. A. Paton, Esq.
HENFIELD, Dykes, Sussex .	150	Wooded, sheltered from E. by wood	—4	Mr. & Miss Milne
HIGH WYCOMBE, Four Acres, Radnage .	500	Open	—3	J. S. Rowntree, Esq.
HIGH WYCOMBE, Woodside .	600	Sheltered on E. by trees and forest N.	6 (24/2/47)	Ernest Grimston, Esq.
HILTON, Hood Ridge, Derby.	120	Open	28	Mrs. Betterton
HITCHIN, Hitchin Priory, Herts.		Sheltered on E. by trees	Zero	Ralph Delme Radcliffe, Esq.
HITCHIN, Kings Walden Bury, Herts.		Open, lake of one acre	15 (21/1/47)	Lt.-Col. J. F. J. Harrison
HORSHAM, Sussex	300	Sheltered by trees	—5	Mrs. John Millais
HORSHAM, South Lodge, Sussex .		Sheltered on E. by trees and forest N.	34 (13/1/47)	Miss G. Godman
HOW MILL, Hayton House, Cumberland	350	Open	Zero	J. C. Lamb, Esq.
HURST, Hurst House, Nr. Reading	350	Open to S., W. & N.	2 (25/2/47)	Mrs. H. B. Harrison
IPDEHAM, Hailey, Oxfordshire	40	Sheltered by hill and trees	24 (30/1/47)	Glynn Williams, Esq.
ISLES OF SCILLY	465	Open	9 (25/2/47)	Major A. A. Dorrien-Smith
KEDDLESTON HALL, Derby .	18	Open to S.W.	20	Mrs. G. Scarsdale
Kew, Royal Botanic Gardens	200	Fairly sheltered by trees	15 (21/1/47)	The Director
KIRKOWAN, Wigtownshire .	120-200	Hilly, much wooded	—5	Mrs. Fleming Hamilton
LAMBERHURST, Scotney Castle	750-800	Open to E.	Zero	E. W. Hussey, Esq.
LAMINGTON, By Biggar, Lanarkshire .	150	Fairly open		Lord Lamington
LANGBANK, Finlaystone, Renfrewshire .				Mrs. R. Blakiston-Houston

THE EFFECT OF FROST OF THE WINTER OF 1946-47—continued.

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			IN SCREEN	ON GRASS	
LEIGHTON BUZZARD, Beds.	Feet	Very open	34		W. Porteous, Esq.
LEYBURN, Constable Burton, Yorkshire	500	Open hilly	25		Mrs. Burdon
LONDONDERRY, Brook Hall	Sea level to	Sheltered except from S.E.			Commander F. Gilliland
	120				
LUDLOW, Hope Bagot, S. Shropshire	800	Undulating, open to N.	7		Mrs. C. Philip Leese
LUTON, Lawrence End, Herts.	500	Well wooded	-2		Lt.-Col. Richard Oakley
MARKYATE, St. Albans, Herts.	450	Open, sloping S.W. sheltered by trees	(2/3/47)		F. A. Sursham, Esq.
MARLBOROUGH, Oare House, Wilts.	500	Open to S. & S.W.	9		Sir Geoffrey Fry, Bt.
MENAI BRIDGE, Craig-y-don, Isle of Anglesey	Sea level to	Sheltered by trees E. & W.	16 (12/2/47)		Mrs. H. Moseley
	100				
MIDDLESBROUGH, Ormesby Hall, Yorks.	120	Open	33		Lt.-Col. J. B. Pennyman
MIDFORD, Court Essington, Nr. Bath	150-250	Sheltered by high hill from N. & N.W.			E. H. Atchley, Esq.
MIDHURST, Ash, Stedham, Sussex	150-180	Garden lies in valley	28		Miss M. Wilson
			on N. wall		
MINESHEAD, North Moor, Somerset.	400	Open to W. and sea	28		V. K. Liddon, Esq.
MINSTEAD, Furzey, New Forest	370	Open	22		R. Dalrymple, Esq.
MONTELOSE, Craigs House		Sheltered by trees			Major E. G. Macpherson-Grant
MUSSELBURGH, Carberry Tower, Midlothian	200	Open	34	33	Lord Elphinstone
NORTHAMPTON, Lampport Grange	460	Open—some shelter from N.E., E. and S.E.			Ada, Lady Frederick
NUTLEY, Chelwood Vachery	500-600	Open	3		A. J. Nettlefold, Esq.
OSINGTON, Spring Bottom, Weymouth	150-200	Exposed to E.			R. Hayne, Esq.
OSSLEY, Leith Vale, Surrey	200	Low lying and a frost pocket			R. D. Trotter, Esq.
OXFORD BOTANIC GARDENS	184	Open to S. & E., city to N. & W.			G. W. Robinson, Esq.
PENCAITLAND, Winton Castle, East Lothian	303	Surrounded by deciduous trees	4 (24/3/47)	0 (24/3/47)	G. F. M. Ogilvy, Esq.
			Zero		

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			IN SCREEN	ON GRASS	
STRATFORD-ON-AVON, Ingon Grange, Warwick.	350	Open	18	2	Miss Chadwick
SUTTONS SCOTNEY, Wonston, Winchester	200	Open			Hon. Lewis Palmer
SWANSEA, Clyne Castle, Blackpill	150	Sheltered from N. open to sea			Admiral A. Walker-
TAVNULT, Muckairn, Argyll	100	On S. side of Lock Etive	3		Heneage-Vivian
TEIGNMOUTH, Clifden, Devon	50	Sheltered except S.S.E.			S. L. Courtauld
TEMBURY, Pond Farm, Shipton Moyne, Glos.	250-300	Open	20 on wall		Dr. B. M. Mules
TWICKSBURY, Ripple Hall, Worcs.	55	Open, River Severn			Mrs. Barton Hudson
THORPE-LE-SOKEN, Thorpe Hall	Sea level	Very open, but well wooded in garden		21 (23/2/47)	E. F. Gray, Esq.
TYDWILLOG, Pwllheli, Caernarvon.	350	Partly sheltered by hills	17		Viscountess Byng of Vimy
UPLAWMOOR, Trees, Renfrewshire	475	Open to S.W., sheltered to N. & W., Loch Libo 1 mile away	10	6	Colonel W. H. Wynne Finch
WATLINGTON PARK, Oxon.	475	Mostly wooded surroundings	(23/2/47)		T. N. Thomson, Esq.
WAREHAM, Creesh Grange, Dorset	750	Open	16 (29/1/47)	26	Hon. Lionel Brett
WARWICK, Park House	200-230	Parkland			J. W. G. Bond, Esq.
WESTONBIRT, Arboretum	450	Open to N. & E.			Mrs. Standing
WEST PORLOCK HOUSE, Minehead	50	Open to N. Bristol Channel, half mile N.	16 (1/2/47)		W. J. Mitchell, Esq.
WEST PORLOCK, Underway, Somerset	100	Open, very windswept	16		Mrs. G. Blathwayt
WHITCHURCH, The Old Court House, Bucks.	550	Open	30		N. G. Hadden, Esq.
WORKING, St. George's, Wych Hill Lane	120	Open, very windswept			Mrs. Kewley
WORMLEY BURY, Broxbourne, Herts.			7.1	— 1.5	Mrs. Anley
WISLEY, R.H.S. Gardens, Surrey			(24.2.47)	(21.12.46)	Major A. Pam
YARM, Crathorne Hall, Yorks.	185	Sheltered by trees	15	30	The Director
				(4/3/47)	T. Dugdale, Esq.

ABBREVIATIONS

K = Killed	† = Growing on or planted near to wall
G = Cut to ground level	Letters <i>N. S. E. W.</i> in italics after wall
B = Badly injured	sign indicate exposure on wall:
S = Slightly injured	North, South, East and West
U = Uninjured	Numerals indicate number of years
* = Recent introduction	planted. They are placed after
	the garden to which they refer.

- Abelia chinensis*. K. Claverley, 2, Handcross, 15. G. Kew. B. R.B.G.E.
floribunda. K. Kew †, R.B.G.E., Westonbirt. B. Nutley, 22. S. Bodnant, Minehead.
grandiflora. K. R.B.G.E. G. Campden. B. Northampton, † E. 36, Henfield, 15, Ardmaddy, Leith Vale. S. Harrogate, Kew †, Wisley.
rupestris. B. Oxford, † S. * S. Sevenoaks, 12. U. Goring-by-Sea.
Schumannii. S. Henfield, 12, Kew, Wisley, Westonbirt, Burghclere, 12. U. Northampton, 28, Wormley Bury, 15, R.B.G.E.
spathulata. U. Westonbirt, protected position.
Engleriana, *Graebneriana*. U. all gardens recorded.
- Abeliophyllum distichum*. U. Musselburgh, Crathes, 5, Bodnant, Wormley Bury, 5, Kew, Wisley. Z. R.B.G.E.
- Abies chensiensis*. B. R.B.G.E. S. Westonbirt. U. Kew, Londonderry.
Forrestii. 1 K. Leith Vale, 20, others U.
Georgei. S. Westonbirt.
holophylla. S. R.B.G.E. U. Kew, Londonderry.
koreana. S. Kew. U. R.B.G.E., Leith Vale, 15, Londonderry.
religiosa. K. Cuckfield, 10, younger plants uninjured. Westonbirt, second time. U. Kew. Z. R.B.G.E.
Webbiana. B. Westonbirt.
amabilis, *balsamea*, *brachyphylla*, *bracteata*, *cilicica*, *Delavayi*, *Fabri*, *Faxoniana*, *magnifica*, *nephrolepis*, *nobilis*, *recurvata*, *sutchuenensis*. U. all gardens including Kew, R.B.G.E., Londonderry, Westonbirt.
- Abutilon* 'Boule de Neige.' K. and some B. Isles of Scilly. Z. R.B.G.E.
 'Canary Bird.' K. West Porlock, † E. 6, sheltered. Z. R.B.G.E.
- Darwinii*. K. Teignmouth. Z. R.B.G.E.
insigne. K. Isles of Scilly, 6. Z. R.B.G.E.
megapotamicum. K. Goring-by-Sea, † S. 9, Bramley, † S. 15, Finchampstead, † S. 6, Sissinghurst, Binfield, † S. 5, Oxford, † S. 1, Wisley. G. Goudhurst, † S.E. 23, Minehead, Henfield, 12. B. Burghclere, † S. 10, B. West Porlock, † S. 6, Kew. S. Chard, † S. 15. U. Isles of Scilly, Wormley Bury, † E. 10. Z. R.B.G.E.
- Milleri*. K. Burghclere, Leith Vale, Oxford, † S. 1, Wisley. S. Burghclere, † 6. Z. R.B.G.E.
- vitifolium*. K. Goudhurst, 10, Henfield, Teignmouth, 10, Dunchidcock, 7, Oxford, † S. 3, R.B.G.E., 1 K., 1 S. 5, Westonbirt. G. Deal, Wisley. B. Burghclere, 10, sheltered S. & W. B. Midhurst, † S. 15, Leith Vale, Kew, †. S. Marlborough, 10, Bodnant. U. Isles of Scilly, Goring-by-Sea.
- Acacia acenacea*. K. & B. Isles of Scilly, 25. Z. R.B.G.E.
armata. U. Falmouth, Isles of Scilly. Z. R.B.G.E.
Baileyana. S. West Porlock, 10. U. Isles of Scilly. Z. R.B.G.E.
dealbata. K. Sidmouth, Rogate, 4, Dunster, Burghclere, † S. 6. G. Stonegate, 6, Hitchin, 9, Minehead, 20, Wisley. B. West Porlock, † 6. U. Isles of Scilly, Falmouth. Z. R.B.G.E.

- Acacia verticillata*. K. Salcombe, 8. U. Isles of Scilly. Z. R.B.G.E.
Acanthopanax Henryi. U. Westonbirt.
Acer Davidi. S. Westonbirt.
 Hersii. K. Oxford. U. Wisley.
 japonicum. U. Westonbirt, winter hardy but spring tender.
 macrophyllum. U. Westonbirt old trees, G. young trees.
 Negundo aureum. K. Westonbirt.
 palmatum. K. Chiddingfold, 40. B. Oxford. S. Kew. U. Burghclere 12. Z. R.B.G.E.
 palmatum dissectum atropurpureum. K. Rednal, 10. B. Oxford. S. Kew. U. Burghclere. Z. R.B.G.E.
 Paxi. K. Westonbirt.
 trifidum. S. Westonbirt.
 All other species grown U. Westonbirt.
Acokanthera spectabilis. K. & B. Isles of Scilly, 25.
Actinidia Kolomikta. S. Wisley. U. Wormley Bury, † S. 10.
Adenocarpus decorticans. U. R.B.G.E.
 frankeniioides. K. Wisley.
 Parkii. K. West Porlock, † E. 7. U. West Porlock House, 12. Z. R.B.G.E.
Agapanthus africanus (umbellatus). S. Dunchidcock. U. Deal, Isles of Scilly, Wormley Bury, R.B.G.E. 10.
 intermedius. U. Northampton, 35.
 montanus, Mooreanus. U. all gardens recorded including Albrighton, Sutton Scotney, Northampton, Isles of Scilly, Burghclere, Wormley Bury, Goring-by-Sea, R.B.G.E., Kew.
Agapetes robusta. K. & G. Isles of Scilly 80. Z. R.B.G.E.
Agave Victoriae-Reginae. U. Isles of Scilly, 12 (under snow). Z. R.G.B.E.
 lophantha. K. Isles of Scilly. B. Kew. Z. R.B.G.E.
Albizzia julibrissin. K. Westonbirt.
 lophantha. K. Isles of Scilly. B. Kew. Z. R.B.G.E.
Aloe arborescens (type). K. & G. Isles of Scilly, 100. Z. R.B.G.E.
 aristata. U. Isles of Scilly, 25. Z. R.B.G.E.
Alnus glutinosa aurea. K. Rednal, 10. U. Kew, R.B.G.E. 30.
 incana aurea. U. Wormley Bury, 15.
Amarcrinum Howardii. G. West Porlock, 3. S. Bodnant. U. Kew.
Amorpha canescens. K. Uplawmoor, 3. Z. R.B.G.E.
Ampelopsis heterophylla (Vitis heterophylla). K. Nutley, 25. B. Leith Vale. U. Kew, R.B.G.E.
 megalophylla. S. Cuckfield, 20. U. Kew, Isles of Scilly.
 Veitchii. K. Skipton, † S. 30. S. Kew. U. Isles of Scilly, Wormley Bury, † S. 100, R.B.G.E. 30.
Anopterus glandulosus. U. Isles of Scilly, 50. Z. R.B.G.E.
Araucaria angustifolia. K. Cuckfield, 6. U. Isles of Scilly.
 Bidwillii. U. Isles of Scilly, 100. Z. R.B.G.E.
 columnaris. K. Isles of Scilly, 100.
 Cunninghamii. U. Isles of Scilly.
 excelsa. B. Isles of Scilly, plants under 40 years old. Z. R.B.G.E.
Arbutus Andrachne. K. R.B.G.E. B. Cuckfield, 10, Henfield, 12, Leith Vale, 20, Kew, young plants. S. Kew, old plants, Bodnant, young plants cut to ground, old plants in open position undamaged. U. Wormley Bury, 15, Goring-by-Sea.
 andrachnoides. S. Bodnant.
 canariensis. U. Isles of Scilly.

- Arbutus Menziesii.* K. Leith Vale, 15, K. young plants, B. old plants, Kew, Westonbirt. S. Wisley S. & U. Bodnant, Cuckfield. U. Isles of Scilly, Goring-by-Sea, R.B.G.E. 30.
- Unedo.* K. Hitchin, 20, Tetbury. G. Oxford, 3. B. Londonderry, 3, Tewkesbury, Ipsden, Royston, Helsby, Leith Vale 20. S. Benenden, Godalming, Bodnant, Kew. U. Isles of Scilly, Wormley Bury, 15, Goring-by-Sea, R.B.G.E.
- Aristolelia Macqui.* B. Salcombe, 25. U. Kew †. Z. R.B.G.E.
- Aronia prunifolia.* G. Binfield, 4. U. Kew, R.B.G.E. 20.
- Arthropodium cirrhatum.* U. Isles of Scilly, 100, survived under snow. Z. R.B.G.E.
- Arundinaria anceps.* K. Leith Vale. G. Chiddingfold, Westonbirt. G. & S. Dalbeattie, 18. B. Kew. S. R.B.G.E. U. Isles of Scilly.
- auricoma.* G. Chiddingfold.
- Hindsii.* B. Leith Vale.
- japonica.* B. Leith Vale. U. Goring-by-Sea.
- Murielae.* U. Leith Vale.
- nitida.* G. Wisley. G. & S. Dalbeattie. B. & S. Kew. U. Leith Vale, Uplawmoor, 7, R.B.G.E.
- Athrotaxis selaginoides.* K. Tynnuilt. S. Kew. Z. R.B.G.E.
- Aucuba japonica.* B. Hitchin, 3. U. Isles of Scilly, Wormley Bury, 50, R.B.G.E., 100.
- Azara Gilliesii.* K. Oxford, † N. 2. B. Londonderry, 15, Goring-by-Sea, 20, Kew. U. Isles of Scilly, R.B.G.E. West Porlock, † 18.
- integrifolia.* G. Oxford, † N. 2. B. Londonderry, † W. 10, Nutley, 22, Kew. U. Isles of Scilly, R.B.G.E., over 10.
- lanceolata.* G. Dunster, Westonbirt. Wormley Bury, 10. B. Bodnant, Londonderry. Midhurst. U. Goring-by-Sea. 16.
- microphylla.* K. Campden, Rhu, Richmond Yorks., † S.E. 30, survived, 30-40. Ludlow, † S., Chiddingfold, Wisley. G. Forres, Briantspuddle, 3, Leith Vale, Ipsden, 18. B. Burghclere, Northampton, † S.E. 36, Londonderry, † E. 10, Osmington, Deal, 30, Oxford, † N. & W. 20-30, R.B.G.E., Guildford, 16, Westonbirt. S. Godalming, Kew, Chard, † S. 50. U. Isles of Scilly.
- microphylla variegata.* K. Wisley.
- serrata.* G. Wormley Bury, 12. B. West Porlock, 12. S. Chard, † S. 6. U. Kew.
- Bauera rubioides.* K. Isles of Scilly, 20. Z. R.B.G.E.
- Beaufortia* sp. K. & G. Isles of Scilly, 25. Z. R.B.G.E.
- Berberidopsis corallina.* K. Oxford, † W. 2. S. Kew, † S. 20, K. young plants in open. G. Westonbirt. S. Bodnant, Marlborough, 25. U. Isles of Scilly. Z. R.B.G.E.
- Berberis buxifolia nana.* K. Campden. B. Leith Vale. S. Oxford. U. R.B.G.E., † 10.
- candidula.* S. Westonbirt.
- Darwinii.* K. Montrose. G. Basingstoke, 30, Burton-on-the-Water, Whitchurch, 6, Hitchin, 8, Claverley, 10, Uplawmoor, 10. B. Edinburgh, Chiddingfold, Forfar, Helsby, 12, exposed plants uninjured, Leith Vale, Oxford. S. Briantspuddle, 18, Bridgnorth, 10. U. Bodnant, Isles of Scilly, Wormley Bury, 12, Goring-by-Sea, R.B.G.E., Kew.
- Fortunei.* K. Westonbirt.
- Hookeri.* B. Oxford. U. Helsby, R.B.G.E., † 10, Kew.
- hypokerina.* K. Westonbirt.

- Berberis Irwinii*. K. & G. Campden. B. Oxford. S. Burghclere, 10. U. R.B.G.E., † 10.
- linearifolia*. G. West Porlock, 4. B. Oxford, 1. S. Burghclere, 10, in frost pocket, Crathes, 8, Leith Vale, Kew, Westonbirt. U. Wisley, Bodnant, 10, Wormley Bury, 12, Goring-by-Sea, R.B.G.E., 10.
- lologensis*. B. Leith Vale. S. Crathes, Kew, Burghclere, Wisley. U. Bodnant, 10, Oxford, Goring-by-Sea, R.B.G.E., 10.
- stenophylla*. K. Glencarse, 20. G. Bridgnorth, 10, Westonbirt. B. Oxford, 20. S. Claverley, 10, Leith Vale. U. Bodnant, 70, Goring-by-Sea, R.B.G.E., † 10, Wisley, Kew.
- Thunbergii atropurpurea*. S. Guildford. U. Burghclere, 8, Leith Vale, Wormley Bury, 15, R.B.G.E., † 10, Kew.
- Wilsonae*. B. Ardingly, Dalbeattie, 18. S. Leith Vale. U. Kew, Goring-by-Sea, R.B.G.E., Oxford, Wormley Bury, 15.
- aggregata Prattii*, *montana*, *polyantha*, *sanguinea*, *verruculosa*, *Wilsonae* var. *subcaulhalata*. U. all gardens recorded including Helsby, Oxford, R.B.G.E., Kew, Leith Vale, Wormley Bury, Westonbirt.
- Beschorneria yuccoides*. B. Osmington, 25. S. Bodnant (on covered wall). U. Isles of Scilly. Z. R.B.G.E.
- Betula Potanini*. K. Westonbirt.
- Bomarea multiflora*. G. West Porlock, † S. 4.
- Brunsdonna Parkeri*. K. Chard, †, grown close to wall, 3. U. Kew, Wormley Bury, 10. Z. R.B.G.E.
- Buddleia alternifolia*. K. Hitchin, 10, Oxford, 1. U. Bodnant, Deal, Goring-by-Sea, Isles of Scilly, Leith Vale, Wormley Bury, 15. Westonbirt, R.B.G.E., 30, U. old plants, S. young plants.
- auriculata*. K. R.B.G.E., Stranraer, † S. 20, West Porlock, † E. G. Goring-by-Sea, Salcombe, Wormley Bury, † S. 12. S. Kew. U. Isles of Scilly.
- Colvillei*. K. Burghclere, 9, K. & G. Deal. S. Chard, R.B.G.E., 30. Marlborough, Kew, †. U. Bodnant, 44, Goring-by-Sea, Glencarse, 17, Thorpe-le-Soken, Wormley Bury, 12.
- Davidi*. K. & G. Hitchin, 9. B. Bignor, Oxford, 1. S. Leith Vale. U. R.B.G.E., 30, Helsby, Kew, Wormley Bury, Wisley.
- Fallowiana*. K. Henfield, 12, Oxford, 1, Westonbirt. G. Burghclere, S. sheltered, Wisley. B. West Porlock, 20. S. Kew, †. U. Isles of Scilly, Wormley Bury, 10.
- Fallowiana alba*. K. Burghclere, 11, Oxford, 1. G. Westonbirt. S. Kew, † N.W. U. R.B.G.E., 30, Goring-by-Sea, Wormley Bury, 10.
- Farreri*. S. Kew, † N.W.
- globosa*. K. Leyburn, 12, Oxford, 1, Wisley. G. Deal, 10, Guildford. B. Forfar, 9, Leith Vale. B. & S. Helsby. S. Binfield, Kew. U. R.B.G.E., Goring-by-Sea, Isles of Scilly, Wormley Bury.
- Lindleyana*. S. Kew, West Porlock, 4.
- officinalis*. B. West Porlock, 10, Wormley Bury, † S. 12. S. Kew. Z. R.B.G.E.
- tibetica*. B. R.B.G.E. S. Northampton, † S. 8.
- insignis* and *sikkimensis*. U. all gardens recorded including Crathes, R.B.G.E., Kew.
- Calceolaria violacea*. B. Kew. S. Burghclere, † W. 7. U. Isle of Arran, † S. 14, Isles of Scilly. Z. R.B.G.E.

- Callicarpa Giralddiana*. K. Westonbirt.
- Callistemon* sp. G. Burghclere, † N. B. Osmington, 20. S. Ardingly.
U. Isles of Scilly.
- coccineus*. S. R.B.G.E.
- floribundus*. K. Dunster. Z. R.B.G.E.
- laevis*. G. West Porlock, 8. Z. R.B.G.E.
- linearifolius*. G. West Porlock, 10, open woodland. Z. R.B.G.E.
- pallidus*. G. Goring-by-Sea, † W., recovered. Z. R.B.G.E.
- rigidus*. G. Bodnant, † W., Burghclere, † S. 7. Z. R.B.G.E.
- vulgaris*. G. West Porlock, open woodland. U. Helsby, 15. Z. R.B.G.E.
- Camellia cuspidata*. U. all gardens including Wormley Bury, Wisley.
- japonica* varieties unmentioned. K. Finchampstead, 8. B. Chiddingfold, Lamberhurst. S. Burghclere, 10, Hawkhurst, Henfield, Stranraer, †. U. Deal, R.B.G.E., West Porlock, Wisley, Wormley Bury, 12-15. U. & S. Leith Vale. Majority S. some U. Kew.
- japonica* × *saluenensis*. K. Kew.
- maliflora*. K. Cuckfield, 8, woodland. S. Kew, young plants freshly planted in woodland. Z. R.B.G.E.
- reticulata*. K. Burghclere, 3. B. Henfield, 5. S. Bodnant, West Porlock. U. Leith Vale, †, Marlborough, Wormley Bury, † E. 10.
- reticulata* wild form. S. Wisley, † E.
- saluenensis*. K. Bignor, 1. K. & G. Hawkhurst. B. Goudhurst, 3, in wood, Westonbirt. S. Leith Vale, Wisley, † N. U. Bodnant. S. in woodland, U. on wall Kew. Z. R.B.G.E.
- Sasanqua*. K. Westonbirt, †. U. all other gardens recorded including Wisley.
- sinensis*. B. West Porlock, 26.
- speciosa*. S. Goring-by-Sea, 12. U. Kew, †, Wormley Bury, † 12. Z. R.B.G.E.
- Campsis* (*Bignonia*) *renusta grandiflora*. K. Westonbirt. U. Burghclere, † S. 6, Chiddingfold, † 40, Leith Vale, †, Kew. Z. R.B.G.E.
- 'Mme Galen.' U. Westonbirt, †.
- Carpenteria californica*. K. Bignor. G. Leith Vale. B. Ardingly, Deal, 9, Oxford, 20. S. Bodnant, † W., Edinburgh, Musselburgh, Wisley. U. R.B.G.E., Kew, Minehead, Wormley Bury, † S. 15.
- californica* Ladhams' var. B. Sutton Scotney, 2, Westonbirt, † S. S. Bodnant, Duns S. 3. Wisley. U. Goring-by-Sea.
- Caryopteris clandonensis*. G. Kew. B. Burghclere, 8, open to south. S. Oxford, 2. U. R.B.G.E., 8, Goring-by-Sea, Sutton Scotney, Wisley.
- Cassia corymbosa*. K. Bignor, †, Dunster, † W., Kew, Salcombe, † S. 15, West Porlock, † S. 3. S. Falmouth. U. Isles of Scilly. Z. R.B.G.E.
- Cassinia fulvida*. K. Oxford, 5, Uplawmoor, 13. G. Kew. U. R.B.G.E., Isles of Scilly.
- Ceanothus arboreus*. K. Goring-by-Sea, †, Westonbirt, † S. 9. U. Tower Court, Ascot, † 16. Z. R.B.G.E.
- 'A. T. Johnson.' K. Kew, †. S. Royston, 5. Z. R.B.G.E.
- austromontanus*. K. Kew, 4.
- 'Autumnal Blue.' K. Bodnant, Wisley. G. Handcross, 12. B. Burghclere, 8, Kew, Westonbirt, †. Z. R.B.G.E.
- azureus*. B. Abingdon, † E., Goring-by-Sea, Kew.
- 'Beauty of Worcester.' K. Christchurch, † S.

- Ceanothus* 'Brilliant.' K. Burghclere, 7, Muckairn, Snowhill, Taynult, Westonbirt.
- Burkwoodii*. K. Westonbirt, †, another B. G. R.B.G.E., 14.
B. Bridgnorth, †, Finchampstead, † S. 10, Kew, Royston.
- 'Cascade.' B. Burghclere, sheltered by wall, S. 9. U. R.B.G.E., 8.
- 'Ceres.' K. Campden. U. R.B.G.E.
- cuneatus*. K. Kew, 9.
- cyaneus*. K. Kew, 20 (in open).
- 'Delight.' K. Kew, 9, Wisley. B. Burghclere, sheltered by S. wall, 10, another plant 10 feet away killed. S. R.B.G.E., 10. U. Sutton Scotney.
- dentatus*. K. Bramley, 15, Hitchin, † S. 40, Nutley, 5, Wisley.
K. & B. Basingstoke, † S. 11, Burton-on-the-Water, † S.W. 15.
B. Birstwith, 20, sheltered, Burghclere, † S. 7, Forres, 14. S. Guildford, 1, Kew, † (S. in open). Z. R.B.G.E.
- dentatus* var. *microphyllus*. K. Kew, 10.
- 'Dignity'. G. Handcross, 12.
- divaricatus*. B. Kew, Osmington, 10. S. R.B.G.E., 8.
- floribundus*. K. Osmington, 10, Oxford, 5. K., B. & G. Claverley.
B. & S. Helsby. Z. R.B.G.E.
- 'Gloire de Versailles.' K. Binfield, Burghclere, 50 per cent., 12 exposed, Campden, Cirencester, † W. 10, Coldstream, † W., Hambleside, 11, Helsby, 17, Rednal, 40. G. Castle Cary, 20, Dorchester, Forres, 7, Sevenoaks, Leyburn, 14, Ludlow, 10, Warwick, Wisley. B. Birstwith, 14, Briantspuddle, 20, Cuckfield, 20, Oxford † S. & E. 5, Pulborough, 16, Watlington, † E. 8, Westonbirt. S. Ardmaddy, Hitchin, 25, Kew, 20. U. R.B.G.E., 25.
- 'Henri Defosse.' K. Burghclere, 10, on low W. wall, another on S. wall untouched. G. Ludlow, 6, Wisley. B. Kew, 5. U. R.B.G.E., 12.
- impressus*. K. Kew, in open, 7. B. Burghclere, 10, sheltered by S. wall, Cuckfield.
- Jepsonii*. K. R.B.G.E., 12. B. Cuckfield, Kew, 8.
- papillosus*. K. Kew, 10, in open, Westonbirt, †. B. Burghclere, 10, sheltered by S. wall. U. R.B.G.E., 10, Wormley Bury, † S. 4.
- rigidus*. K. Bradford-on-Avon, † S. 4, Chard, † 6, R.B.G.E., 12, Godalming, Goudhurst, † N.E., 8, Musselburgh, Thorpe-le-Soken, † 15, Westonbirt, Wisley. K. & S. Benenden. G. Dorchester. B. Binfield, † 10, Burghclere, † S. 8, Edinburgh, † E., Kew, on wall, 20, K. in open, Sidmouth, 20.
- roseus*. S. Briantspuddle, 20, Kew.
- Russellianus*. K. Osmington, 6, Westonbirt. B. Kew.
- sorediatus*. K. Kew.
- thyrsiflorus*. B. Greenlaw, 5. U. & B. R.B.G.E. B. 10, K. young plants in border, Kew.
- 'Topaz.' G. Ludlow, 6. S. Kew.
- Veitchianus*. K. Bridgnorth, Godalming, Kew, in open, 15, Oxford, † S., Wisley. B. Briantspuddle, 5, Bridgnorth, Finchampstead, † S. 10, Sevenoaks, 9. B. & U. West Porlock House, † E. S. Sissinghurst, 12. U. Woking, †. Z. R.B.G.E.
- verrucosus*. K. Kew, 8.
- Ceanothus*—all varieties and species. K. Wormley Bury on S. & W. walls except *C. papillosus*.
- Ceratonia Siliqua*. K. Dunster, S. exposure. Z., R.B.G.E.

- Ceratostigma Griffithii*. G. Bodnant, Wisley. B. R.B.G.E., 3, Henfield, 12, Kew. U. Isles of Scilly.
- minus*. K. Kew.
- Willmottianum*. K. Beaconsfield, 7. G. Nutley, 20, Salcombe, † S. 20, Goring-by-Sea, Wisley, Wormley Bury (as usual), † S. 15. B. Henfield, S. 12, Kew. S. Bicester, 7, Bodnant. U. R.B.G.E., 25.
- Cercidiphyllum japonicum*. B. Nutfield, 20. U. R.B.G.E., 25, Goring-by-Sea, Kew, Wormley Bury, 15. U. and 1 K. Leith Vale.
- Cercis Siliquastrum*. K. Campden. G. Taynult, 6. B. Osmington, 25. S. Burghclere, 9. U. Bodnant, 20, R.B.G.E., Goring-by-Sea, Kew, Wisley, Wormley Bury, 12.
- Cestrum Newellii*. K. Osmington, 40. Z. R.B.G.E.
- purpureum*. K. Dunster. G. Salcombe, 6. Z. R.B.G.E.
- Chaenomeles japonica* (*Cydonia Maulei*). G. Connel. S. Leith Vale. U. R.B.G.E., 30, Goring-by-Sea, Isles of Scilly, Kew, Oxford, 20.
- lagenaria* (*Cydonia japonica*). U. R.B.G.E., 30, Goring-by-Sea, Isles of Scilly, Leith Vale, Kew, Oxford, Rednal, 10.
- Choisya ternata*. K. Hitchin Priory, 7. K. & G. Hitchin. G. Wisley. B. Basingstoke. S. Bicester, Birstwith, Kew, Osmington, Pulborough, 18. U. Bodnant, R.B.G.E., † 10, Goring-by-Sea, Helsby, Isles of Scilly, Northampton, 32, Wormley Bury, 15, various locations.
- Cistus Aguilari*. K. Oxford, 1. U. Northampton. Z. R.B.G.E.
- corbariensis*. K. Ardmaddy, 7, Helsby, 17. G. Kew. Z. R.B.G.E.
- crispus*. K. Benenden, Briantspuddle, 3, Oxford, Wormley Bury, 15. B. Claverley, 3, Kew. Z. R.B.G.E.
- cyprius*. K. Coldstream, 6, Finchampstead, 10, Leith Vale, Oxford, 1, Wormley Bury, 15. S. & B. Kew. U. R.B.G.E., 4, Goring-by-Sea.
- florentinus*. K. Dalbeattie, 6, R.B.G.E., Kew.
- ladaniferus*. K. Benenden, Burghclere, Bodnant, † 8, R.B.G.E., Finchampstead, Leighton Buzzard, Ludlow, 15, Oxford, 2, Sutton Scotney, 6, Wormley Bury, 15. B. & S. Northampton. S. Kew. U. Goring-by-Sea. K. & B. Helsby, 17.
- laurifolius*. G. Basingstoke, 15, sheltered. S. Kew, Leith Vale. U. Bodnant, R.B.G.E., † 10, Helsby, Oxford, 2, Wormley Bury, 20.
- lusitanicus*. K. Burghclere, 7.
- **Palhinhaei*. K. Benenden, sheltered from N. & E., Kew, Wisley. U. Burghclere, Goring-by-Sea. Z. R.B.G.E.
- **populifolius lasiocalyx*. K. R.B.G.E., 5. S. Kew. U. Northampton, † S.
- purpureus*. K. Benenden, Briantspuddle, 2, Burghclere, † W. 6, Northampton, 12, Oxford, 2, Wormley Bury. K. & B. Bodnant, Kew. S. R.B.G.E., 6. U. Goring-by-Sea.
- rosmarinifolius*. K. Bridgnorth, R.B.G.E., 4.
- salicifolius*. K. Benenden, Handcross.
- 'Silver Pink.' K. Briantspuddle, 3, Burghclere, 6, Christchurch, 7, Finchampstead, 9, Oxford, 2, Wormley Bury. K. & B. Kew. U. R.B.G.E., 5, Helsby, Ludlow.
- Cistus* species as above, U. Isles of Scilly.
- Clematis Armandi*. G. Goudhurst, † S.E. 10, Northampton, † S. 32. B. Nutley, 20, Oxford, † S. 3. S. Kew, †. U. Bodnant, Goring-by-Sea, Leith Vale, † Isles of Scilly. Z. R.B.G.E.
- bicolor*. G. Bodnant, new growth produced. Z. R.B.G.E.

- 'Crimson King.' S. Campden, † S. Z. R.B.G.E.
Forrestii. K. Kew.
indivisa. B. West Porlock, † E. 10. S. Bodnant on covered wall. Z. R.B.G.E.
macropetala. U. Albrighton, 15, Bodnant, Burghclere, 12, Crathes, † W. 8, R.B.G.E., 8, Goring-by-Sea, Kew, Wisley. U. & S. Leith Vale, †.
 'Lady Northcliffe.' S. Campden, † S. U. Kew.
tangutica. K. Dunster, † S., Oxford, † S. 2. G. in open, S. sheltered wall Kew, S.W. U. Bodnant, Burghclere, † S. 12, Goring-by-Sea, R.B.G.E., 15. Wormley Bury. † S and W.
Clethra arborea. K. Osmington, 10. Wormley Bury, 20. S. Kew, Leith Vale. U. Dunster, Isles of Scilly, 100. Z. R.B.G.E.
Delavayi. B. Westonbirt. S. R.B.G.E., 8, Kew. U. Bodnant, Burghclere, 12, sheltered all round, Glencarse.
Clanthus puniceus. K. Cuckfield, Kew, Goring-by-Sea. U. Isles of Scilly. Z. R.B.G.E.
Coleonema album. K. Kew. K. & G. Isles of Scilly, 50. Z. R.B.G.E.
roseum. U. Isles of Scilly, 20. Z. R.B.G.E.
Colletia armata. B. Kew, Oxford, 10, Salcombe, 30. U. Goring-by-Sea, Z. R.B.G.E.
Commelina coelestis. K. Chard, 10, close to wall, R.B.G.E. U. Isles of Scilly, Kew.
Convolvulus Cneorum. K. Bodnant on covered wall, K. Burghclere against house, S. B. Deal, 15, Kew. Z. R.B.G.E. U. Wormley Bury. † S.
mauritanicus. B. Deal, a few plants almost intact. U. Isles of Scilly. Z. R.B.G.E.
Cordylina indivisa. K. Kew, Osmington, 10, West Porlock. K., G. & B. Salcombe. G. Minehead, Teignmouth, 25. U. Isles of Scilly. Z. R.B.G.E.
Cornus capitata. K. Benenden, Goring-by-Sea, one plant uninjured. K. & B. Osmington. B. Horsham. S. R.B.G.E., 3, Kew.
florida rubra. K. Chiddingfold, Dunchidcock. S. Kew, Leith Vale. U. Burghclere, 12, R.B.G.E. 3, Westonbirt.
Kousa chinensis, *Nuttallii*. U. all gardens recorded including R.B.G.E., Goring-by-Sea, Helsby, Kew, Leith Vale, Westonbirt, excepting one record of bad injury to *C. Kousa chinensis* at Wormley Bury, 15.
Corokia Cheesemanii. K. Dunster. S. Bodnant. Z. R.B.G.E.
Cotoneaster. K. Bicester, 6. G. & B. Burghclere, 10. S. Kew. U. R.B.G.E., 20, Goring-by-Sea, Isles of Scilly.
virgata. K. Oxford, † S. 1.
Coronilla glauca. K. Burghclere, † S. 7, Dunchidcock, Kew, Shedfield, 6, Teignmouth, 10. U. Isles of Scilly.
pygmaea. S. Wormley Bury † S.
Correa speciosa. K. Salcombe, † S. 10. U. Isles of Scilly. Z. R.B.G.E.
Corylopsis glabrescens. S. R.B.G.E., 8. U. Glencarse, 8, Kew.
pauciflora. U. Glencarse, 8, Northampton, 30, Westonbirt. Z. R.B.G.E.
platypetala. S. Westonbirt.
sinensis, *spicata*, *Veitchiana*, *Willmottiae*. All U. Kew.
Cotinus americanus (*Rhus cotinoides*). K. Leith Vale, U. R.B.G.E. 8, Kew.
Coggyria (*Rhus Cotinus*). K. Londonderry 12. G. Forres, Guildford, 1, Leyburn 10. S. & U. Burghclere. U. Bodnant, R.B.G.E., Goring-by-Sea, Helsby, Kew.

- Cotoneaster buxifolia*. K. Rednal, 3. U. R.B.G.E., 10, Leith Vale.
glaucophylla. K. Westonbirt.
Hookeri. G. Campden. S. Kew.
lactea. G. Oxford.
rotundifolia. G. Oxford.
serotina. K. Kew, Leith Vale. K. & U. Burghclere, 8. S. Guildford, 1. U. R.B.G.E., 10, Goring-by-Sea.
Wardii. B. Westonbirt.
Watereri. K. Campden. U. R.B.G.E., 10, Goring-by-Sea, Kew, Leith Vale.
Cowania Stansburiana. K. Cuckfield, † W. 15. Z. R.B.G.E.
Crinodendron (Tricuspidaria) dependens. K. Wisley. G. Helsby, 13, Oxford. B. Kew. Z. R.B.G.E.
Hookerianum (Tricuspidaria lanceolata). K. Dorchester, 16, Swansea. G. Ambleside, 12, Bodnant, Burghclere, 12, Forres, 10, Leith Vale, Minehead, Musselburgh, Westonbirt. B. Ardmacdy, Brodick, 20, Dalbeattie, † S.W. 15, R.B.G.E., Kew, Londonderry, 20, Marlborough, 8, Nutley, 20, Osmington, Rhu, 15, Sevenoaks, Stranraer, West Porlock, 20. S. Carradale, 15, Pulborough, 15, Salcombe, 10. U. Falmouth, Isles of Scilly.
Crotalaria capensis. K. & G. Isles of Scilly, 25. Z. R.B.G.E.
Cryptomeria japonica elegans. S. Dunchidcock. U. R.B.G.E., Leith Vale, Westonbirt.
Cupressus arizonica pyramidalis. B. Leith Vale. U. Goring-by-Sea, Northampton, 12.
cashmeriana. S. Burghclere, 10, Londonderry, 10, West Porlock, 18.
Duclouxiana. S. Westonbirt. U. R.B.G.E., † 10, Leith Vale. young plants, Londonderry, 7, Northampton, doubtfully hardy.
formosensis. S. Londonderry, 10, Westonbirt. B. Leith Vale, 25, Z. R.B.G.E.
Goveniana. K. Oxford.
Lawsoniana. S. How Mill, 70, sheltered. U. R.B.G.E., Kew, Westonbirt.
lusitanica. K. Cuckfield. U. Isles of Scilly, Kew.
lusitanica Bentharii. B. Londonderry, 10. Z. R.B.G.E.
lusitanica pendula glauca. U. Goring-by-Sea.
macrocarpa var. 'Donald Gold.' K. Ludlow. B. Burghclere, 10, Christchurch, Farnham. S. Kew, Tydweiliog, 8. Z. R.B.G.E.
obtusa ericoides. B. Leith Vale. U. R.B.G.E., 15, Northampton, 30.
sempervirens. K. Muckairn, Taynuilt, 4. B. Leith Vale. U. Bodnant, 15, R.B.G.E., 30, Helsby, Kew.
Cyathea dealbata. U. Isles of Scilly.
medullaris. K. Isles of Scilly.
Cytisus albus. S. Kew. U. Helsby, 12. Z. R.B.G.E.
 **Battandieri*. B. Bridgnorth, 10, Burghclere. S. R.B.G.E., † 10, Leith Vale, 10, Sevenoaks, 9, Wisley. U. Goring-by-Sea, Goudhurst, Kew, Westonbirt. † W. Wormley, Bury, 15.
Burkwoodii. K. Henfield, 11. G. Burghclere, 10. S. R.B.G.E., 4, Kew.
canariensis. U. Isles of Scilly.
filipes. K. Isles of Scilly, Kew. Z. R.B.G.E.
 'Lord Lambourne.' K. & B. Burghclere, 10, Kew. Z. R.B.G.E.
 'Peter Pan.' B. Burghclere, 10. Z. R.B.G.E.
 'Porlock.' B. Oxford, 2. S. West Porlock, 20. U. Northampton, 2. Z. R.B.G.E.

- scoparius*. K. Aalldgirth, Dalbeattie, Rednal, 10. K. & G. Hitchin.
 U. Isles of Scilly. Z. R.B.G.E.
- scoparius prostratus* (*Genista prostrata*). K. Hitchin, 8.
- stenopetalus*. K. Kew. U. Isles of Scilly.
- Daboecia azorica*. K. Kew, Leith Vale. B. Burghclere. S. & B. Bodnant. S. R.B.G.E., Goring-by-Sea.
- cantabrica*. K. Kew, Leith Vale. G. Wisley. B. R.B.G.E. U. Helsby.
- Daphne acutiloba*. K. Kew, Wisley.
- Genkwa*. K. & B. Bodnant, Kew. B. Henfield, 2. Z. R.B.G.E.
- hybrida*. K. Westonbirt.
- indica*. U. Henfield, 12. Z. R.B.G.E.
- Laureola*. S. Wisley
- retusa*. U. Wormley Bury, 15.
- Datura sanguinea*. K. West Porlock, 20. B. Isles of Scilly. Z. R.B.G.E.
- Delphinium varieties. K. Ludlow, Skipton, 3. U. Burghclere, R.B.G.E.
- Dendromecon rigidum*. K. Kew. S. Musselburgh. Z. R.B.G.E. U. Wormley Bury, † S.
- Desfontainea spinosa*. K. How Mill, Oxford, † N. 2, R.B.G.E, Westonbirt, † N. K. & S. Burghclere, † N. 11. Wormley Bury, 10. B. Nutley, 25, Rhu, 17. S. Dunchidcock, 15, Kew, Wareham. U. Bodnant, Isles of Scilly.
- Desmodium penduliflorum*. G. Campden, R.B.G.E. G. & B. Kew.
- Deutzia taiwanensis*. K. Westonbirt.
- Dicksonia antarctica*. K. Londonderry, 8. K. & B. West Porlock, 8. S. Isles of Scilly. Z. R.B.G.E.
- Discaria serratifolia*. B. Kew, 35.
- Drimys aromatica*. K. Kew. G. Burghclere, 10, Dunchidcock, Westonbirt. B. Henfield, Nutley, 15. B. & S. Rhu, 12. S. Crathes, † E., Osmington, 10, Salcombe. U. R.B.G.E., 15, Isles of Scilly.
- colorata*. K. Kew. U. Crathes, † N. 8, covered by snow, R.B.G.E., Isles of Scilly.
- Winteri*. K. Leith Vale, Oxford, † S., 1, Pulborough. G. Ardingly, Bradford-on-Avon, † S. 20, Henfield, 8, Horsham, Minehead, Stranraer, Thorpe-le-Soken. B. Dunchidcock, Kew, Goring-by-Sea, Londonderry, Marlborough, 10, Osmington, 10, Salcombe, 25, Teignmouth, 25. B. & S. Rhu, 12. U. Isles of Scilly. Z. R.B.G.E.
- Eccremocarpus scaber*. K. R.B.G.E. U. Brodick, † S. 8, Goring-by-Sea, Isles of Scilly, Kew, † S., Oxford.
- Echium simplex*. K. Isles of Scilly. Z. R.B.G.E.
- sp. K. Goring-by-Sea. Isles of Scilly survived. Z. R.B.G.E.
- Elaeagnus pungens maculata*. K. Wormley Bury, 8. B. Oxford, 1. U. R.B.G.E., 30, Goring-by-Sea, Isles of Scilly, Kew, Leith, Vale Uplawmoor, 5, Westonbirt.
- Embothrium coccineum*. K. Westonbirt. B. Londonderry, †, Wareham. S. Thorpe-le-Soken. U. Benenden, Bodnant, R.B.G.E., Falmouth, Henfield, Salcombe.
- **lanceolatum*. K. Benenden, Burghclere, 12, Wisley. K. old stems, S. suckers, Leith Vale. B. Cuckfield, † S. 10. B. & S. Rhu. U. Chard, Crathes, †.

- **Embothrium longifolium*. K. Burghclere, 12, Crathes, 7, woodland, Leith Vale, West Porlock, 8. G. Ipsden, 9. B. Wormley Bury, 12. U. Goudhurst, 10, protected.
- Emmenopterys Henryi*. U. Crathes, † E. 6, Goring-by-Sea, R.B.G.E., 20, Kew.
- Enkianthus campanulatus, perulatus*. U. All gardens recorded including Burghclere, 12, R.B.G.E., 20, Helsby, Leith Vale, Kew, Uplawmoor, 5, Westonbirt.
- Ercilla volubilis*. G. Oxford, † N.
- Erica arborea*. K. Burghclere, R.B.G.E., Henfield, 15. K. & G. Kew, G. Hitchin, Leith Vale. B. Nutley, 18. U. Isles of Scilly.
- arborea alpina*. U. Wisley.
- australis*. K. Henfield, 17. G. Goudhurst, 10, Handcross, Wisley. G. & B. Burghclere, 10. B. R.B.G.E., † 10, Kew. U. Bodorgan, 2, Isles of Scilly, Helsby, 18.
- lusitanica*. K. R.B.G.E., Henfield, Handcross, 15, Kew, Leith Vale. K. & B. Burghclere. G. Goudhurst, Wisley. B. Wormley Bury, 15. U. Isles of Scilly.
- mediterranea*. K. Leith Vale. G. Benenden, Handcross, Wisley. B. Westonbirt. S. Burghclere, Kew, Oxford. U. R.B.G.E., † 10, Isles of Scilly.
- Eriobotrya japonica*. K. Stratford-on-Avon. B. Burghclere, † S. 8, Londonderry, † S. 15, Oxford, Wisley. U. R.B.G.E., † 10, Henfield, 18, Kew, † S.W.
- Erlangea tomentosa*. K. Isles of Scilly, Kew. Z. R.B.G.E.
- Escallonia* 'Apple Blossom.' K. Leith Vale. G. Burghclere, 8. B. R.B.G.E., 5, Kew. S. Wisley. U. Isles of Scilly.
- 'C. F. Ball.' K. Leith Vale. B. Kew, Osmington, 10, Oxford, 2, Westonbirt, †. U. Goring-by-Sea, Isles of Scilly, R.B.G.E., † 10.
- compacta*. G. Burghclere, 8, R.B.G.E., 8, Kew. U. Isles of Scilly.
- 'Donard Seedling.' G. Binfield, 10. K. Westonbirt, one plant S. in sheltered position, Hitchin, 8. B. Kew, Oxford. U. R.B.G.E., 20, Isles of Scilly.
- edinensis*. K. Campden, Wormley Bury † S. G. Hitchin, 8. B. Leith Vale, Kew. S. Binfield, 10, Oxford. U. R.B.G.E., 30, Isles of Scilly, Goring-by-Sea.
- **Fonckii*. S. Crathes, † S. 18, Kew. U. R.B.G.E., 20, Isles of Scilly.
- Ingramii*. G. Ipsden, 18. B. Cirencester, † W. 10, Kew. S. Wisley, † S. U. Isles of Scilly.
- **Iveyi*. K. Leith Vale, Wisley. G. Binfield, 5, Northampton, Sutton Scotney, 7. G. & B. Kew. B. R.B.G.E., 20, Goudhurst, Osmington. S. Bodnant, Helsby, 10. U. Goring-by-Sea, Isles of Scilly.
- langleyensis*. Leith Vale, †. G. Campden, Handcross, 18. B. Dalbeattie, Edinburgh, Kew. S. Birstwith, 7, Westonbirt. U. Bodnant, Helsby, 16, R.B.G.E., 30, Isles of Scilly.
- macrantha*. B. Oxford, † E.
- montevideensis*. K. Bignor, † S. 4, Burghclere, † S. 8, Cuckfield, 5, Kew. U. Isles of Scilly. Z. R.B.G.E.
- organensis*. U. Goring-by-Sea, Helsby, 18, Isles of Scilly.
- **revoluta*. G. R.B.G.E., † 10. B. Kew. S. Crathes, † S. 18.
- rubra*. K. Oxford, † W., Rednal. G. Campden. S. Kew, Pulborough, † S. 25. U. R.B.G.E., 20.

- Escallonia Veitchiana*. G. Basingstoke, 12, Henfield, 18, Hitchin. B. Ambleside, Claverley, 12, Crathes, Kew, Pulborough. G. & B. Stranraer. S. Marlborough, 20. Z. R.B.G.E.
- virgata*. G. Wisley. U. R.B.G.E., 30, Helsby, Isles of Scilly, Kew.
- Eucalyptus coccifera*. K. Kew. S. West Porlock, 15, Wisley. Z. R.B.G.E.
- ficifolia*. K. Isles of Scilly.
- Globulus*. K. Dunchidcock, 7, Kew, Osmington, 10, Oxford, † W. 1. U. Isles of Scilly. Z. R.B.G.E.
- Gunnii*. G. Dunchidcock, 7. B. Menai Bridge, 80. S. Ipsden, 18, Kew. U. R.B.G.E., † 10, Henfield, Isles of Scilly.
- urnigera*. B. Kew, Salcombe, 40. U. Isles of Scilly. Z. R.B.G.E.
- whittingehamensis*. G. R.B.G.E. S. Kew, Thorpe-le-Soken. U. Crathes, 26, Isles of Scilly.
- Eucryphia cordifolia*. K. Beneden, Kew, Leighton Buzzard, 2. Wormley Bury, 10. G. Westonbirt, Burghclere. B. Bodnant, Horsham, 30, Marlborough, 3, Nutley, 20. West Porlock, Wareham. B. & S. Ardingly, Rhu. S. Ardmaddy, 7. U. R.B.G.E., 4, Isles of Scilly, Salcombe, 30.
- glutinosa (pinnatifolia)*. K. & B. Leith Vale, 15. G. Birstwith, 20, Oxford, 1. B. Forres, 10, Chiddingfold, Godalming, Stonegate, 12. B. & S. Rhu (young plants not affected). S. Marlborough, 8. S. & U. Burghclere. U. Bodnant, R.B.G.E., 30, Kew, Salcombe, 30, Wormley Bury, 12.
- intermedia* 'Rostrevor.' B. Crathes (14-foot plant killed above snow), Guildford. S. Bodnant, 10, Chiddingfold, 7, Kew. S. & U. Burghclere. U. R.B.G.E., 6.
- lucida (Billardieri)*. K. Westonbirt, B. in another position. G. R.B.G.E., 15, Guildford. B. & S. Burghclere, 13, Kew. S. Wisley, † E. U. Bodnant, 15, Brodick, † S., West Porlock, 20.
- Milliganii*. K. Kew. S. Burghclere, 8. U. Bodnant 10, Crathes, 20. Z. R.B.G.E.
- Moorei*. K. Kew, Wisley, † N. G. Buckfield, in wood uninjured, † S., Nutley, 14. B. Goudhurst, 8. S. Bodnant, (on covered wall).
- *nymansensis*. K. Leith Vale, Wisley. G. Chiddingfold, 5, Henfield, 18. B. Ardingly, Bignor, 10, Burghclere, 13, Chiddingfold, Edinburg, Ipsden, Guildford, Oxford, Westonbirt. S. Bodnant, Brodick, 10, Handcross, 12, Goudhurst, Kew, Wareham, West Porlock, Woking. U. Chard, 10, R.B.G.E., 15, Goring-by-Sea.
- Eugenia aciculata (Myrtus Luma)*. K. Marlborough, 12, Salcombe, † E. G. Horsham. B. Henfield, 15. U. Isles of Scilly. Z. R.B.G.E. D. Kew.
- Euonymus grandiflora*. K. Westonbirt.
- japonica*. K. (where flooded) Oxford. K. & G. Hitchin, 5-20 years. U. R.B.G.E., 20, Isles of Scilly, Kew.
- pendula*. S. Salcombe, 30. Z. R.B.G.E.
- yedoensis*. G. Campden. U. Burghclere, 12, R.B.G.E., 15, Kew, Leith Vale, Westonbirt.
- Eupatorium micranthum*. K. Kew. G. Dunchidcock, 15, Wisley, † S. U. Isles of Scilly. Z. R.B.G.E.
- Weinmannianum*. K. Kew. G. Burghclere, 8, Oxford, 2. U. Isles of Scilly. Z. R.B.G.E.
- Euphorbia Characias*. K. Albrighton, 20, Oxford, 1. U. Wisley, † W. Z. R.B.G.E.

- Euphorbia mellifera*. K. Oxford, 1. G. Crathes, 10. U. Isles of Scilly.
Wulfenii. K. Great Amwell, Oxford, 3. Wormley Bury, 10.
 U. R.B.G.E., Goring-by-Sea, Isles of Scilly, Kew.
- Euryops virgineus*. K. Kew. U. Isles of Scilly, 50. Z. R.B.G.E.
- Fabiana imbricata*. K. Oxford, Teignmouth. B. Kew, Wisley, † E. U.
 Burghclere (protected), Thorpe-le-Soken, R.B.G.E.
imbricata violacea. K. Great Chalfield, 4, Oxford. U. Burghclere
 (protected), R.B.G.E., 6, Salcombe, 10.
- Feijoa Sellowiana*. K. Ash Stedham, † S. 4, Dunchidcock. G. Castle
 Cary, Chard, on wall, Westonbirt. B. Bodnant, Edinburgh, † S.,
 Kew, Marlborough, 18, Osmington, West Porlock, Wisley. S.
 Goring-by-Sea. U. Isles of Scilly. Z. R.B.G.E.
- Ficus macrophylla*. K. Isles of Scilly. Z. R.B.G.E.
- Figs (*Ficus Carica*). K. Bignor, Cirencester, † S. & E. 15. G. Chidding-
 fold, Forres, Hitchin, 20, Oxford, † W. 20, Whitchurch, 5. G. & B.
 Deal. B. R.B.G.E., 20, Fordwich, † W., Markyate, †, Rogate. U.
 Isles of Scilly.
- Fitzroya patagonica*. K. How Mill, 7. U. Bodnant, 50, R.B.G.E., 10,
 Westonbirt.
- Fremontia californica*. K. Bodnant, one plant on covered wall undamaged,
 Finchampstead, † S., Teignmouth, Wisley, † S. Z. R.B.G.E.
- Fuchsia corymbiflora*. G. Isles of Scilly West Porlock, 10. Z. R.B.G.E.
excorticata. U. Isles of Scilly.
macrostemma. G. Ludlow, 10. B. Salcombe, 3-12. U. R.B.G.E.,
 † S.
magellanica. G. Burghclere, Oxford. Wormley Bury (as usual).
 U. R.B.G.E., † 25, Goring-by-Sea, Isles of Scilly, Kew, Sutton
 Scotney.
magellanica riccartonii. G. Bodnant, Burghclere. Wormley Bury
 (as usual). S. Dalbeattie, Leith Vale, Oxford, Salcombe. U.
 R.B.G.E., Goring-by-Sea.
- Garrya elliptica*. K. Leighton Buzzard, † S., Montrose, 30, Sevenoaks,
 Wisley. G. Campden. B. Basingstoke, 11, Leith Vale, 20,
 Osmington, 15. S. Claverley, 10, Kew, Oxford, 15, St. Andrews.
 U. Bodnant, 70, R.B.G.E., † 30, Helsby, 25, Westonbirt, †.
 Wormley Bury, † E, 25.
- Gaultheria fragrantissima*. S. Cuckfield, 10. Z. R.B.G.E.
glauca alba. G. Westonbirt.
tetramera. K. Leith Vale, Wisley. B. Cuckfield, 10. Z. R.B.G.E.,
 8.
- Gaulthetia wisleyensis*. G. Wisley. B. R.B.G.E., 5. S. Burghclere, 10.
 U. Leith Vale, Kew.
- Gazania* sp. and hybrids. K. Oxford. Scarcely harmed Isles of Scilly.
 Z. R.B.G.E.
- Genista aetnensis*. B. Wisley. S. Leith Vale, Uplawmoor, 5, Weston-
 birt. U. Kew, Oxford.
cinerea. K. Birstwith, 4, Westonbirt. S. Oxford. U. Goring-by-
 Sea, Kew.
hispanica. G. Dalbeattie, Wisley, Oxford. B. Helsby. S. Goring-
 by-Sea, Kew. U. R.B.G.E.
tinctoria. K. & B. Claverley, various ages. S. Birstwith, 20,
 R.B.G.E., † 10, Oxford. U. Kew.

- Gerbera Jamesonii*. S. Bideford, 10 per cent. damaged, Hawkhurst, 8, flowered well as usual. Z. R.B.G.E. U. Wormley Bury.
- Gevuina Avellana*. B. Cuckfield, 15, younger plants killed. Z. R.B.G.E.
- Goodia lotifolia*. G. Isles of Scilly, 12. Z. R.B.G.E.
- Gordonia Altamaha*. K. Dunchidcock, 5, Kew, Wisley. S. Burghclere, 9.
- anomala*. U. Isles of Scilly. Z. R.B.G.E. Wormley Bury, 15.
- chrysandra*. K. Ash Stedham, † S. 4. Z. R.B.G.E.
- Grevillea robusta*. G. Isles of Scilly, 40. Z. R.B.G.E.
- rosmarinifolia*. K. Leith Vale, Thorpe-le-Soken, Wisley. G. Musselburgh. B. Kew. U. R.B.G.E., Isles of Scilly, Salcombe.
- sulphurea*. K. Leith Vale, Sissinghurst, 4. B. Henfield, 8, Kew. U. Salcombe, 15.
- Greyia Sutherlandii*. U. Isles of Scilly, 25. Z. R.B.G.E.
- Griselinia littoralis*. G. Wisley. B. Kew, Nutley, 14. U. Goring-by-Sea, Isles of Scilly. Z. R.B.G.E.
- lucida*. B. Kew. S. Cuckfield. U. Isles of Scilly. Z. R.B.G.E.
- Hakea acicularis*. K. Burghclere, 9. G. Ardingly. Z. R.B.G.E.
- sauveolens*. K. Isles of Scilly.
- Halimium lasianthum*. K. R.B.G.E. old plants, Helsby, 20.
- Hamamelis mollis*. S. Campden. U. Bodnant, Burghclere, 12, R.B.G.E., 20, Kew, Leith Vale, Westonbirt. Wormley Bury, 15.
- Hedychium Gardnerianum*. U. Salcombe. Z. R.B.G.E.
- Helianthemum* sp. unnamed. K. Dalbeattie, Bodorgan, Christchurch, Sidmouth, Uplawmoor, R.B.G.E. old plants. K. & G. Kew.
- Helichrysum subglomeratum*. K. Kew. S. Albrighton, 10. Z. R.B.G.E.
- Hesperantha radiata*. U. Albrighton, under water November. Z. R.B.G.E.
- Hibbertia* sp. G. Isles of Scilly. Z. R.B.G.E.
- Hibiscus syriacus* varieties. B. Uplawmoor, 6. U. & S. Leith Vale. U. R.B.G.E., 8, Goring-by-Sea, Westonbirt. Wormley Bury, 15.
- syriacus monstrosus plenus*. B. Campden. Z. R.B.G.E.
- Hippophae rhamnoides*. K. Rednal, 3. U. R.B.G.E., † 20, Kew, Leith Vale, Wormley Bury 12.
- Hoheria glabrata* (*Plagianthus Lyallii*). K. Burghclere, 12, Leith Vale, Wisley, † N. B. Deal, 12, Hatfield. S. Goudhurst, Minehead. S. & U. Kew. U. R.B.G.E., 8, Isles of Scilly, Goring-by-Sea. Z. R.B.G.E.
- populnea*. K. Wormley Bury, 6. G. Burghclere. S. Kew, Minehead. U. Goring-by-Sea, Isles of Scilly. Z. R.B.G.E.
- sexstylosa*. G. Westonbirt (*lanceolata* form). B. Burghclere, Goring-by-Sea. S. Minehead. U. R.B.G.E., 6.
- Hollyhocks (*Althaea rosea*). K. Skipton, 2. U. Kew, Rogate, 4.
- **Hydrangea aspera*. B. Burghclere, 10. U. Bignor, 15, Bodnant, 20, R.B.G.E., 20, Goring-by-Sea, Westonbirt.
- macrophylla*. G. Wisley. B. Chiddingfold. S. Bodnant, Burghclere, 10, Godalming, Stranraer, 10. U. & G. Leith Vale. U. R.B.G.E., 5.
- quercifolia*. K. Ardmaddy, 2. B. Wisley. U. Bodnant, Burghclere, 4. R.B.G.E., 10, Helsby, 12, Kew, Westonbirt, †.
- Sargentiana*. B. Wisley, Burghclere, 10. S. Leith Vale. U. Bodnant, Bignor, R.B.G.E., 20, Kew, Westonbirt, Wormley Bury.
- villosa*. B. Burghclere, Wisley, Leith Vale. S. Kew. U. Goring-by-Sea, R.B.G.E., 20, Westonbirt.

- Hypericum Hookerianum* Leschenaultii. G. Westonbirt.
patulum. G. Leith Vale. G. & B. Forfar. S. Goring-by-Sea, Kew, Westonbirt. U. R.B.G.E., Isles of Scilly.
Forrestii. G. Wisley. B. Leith Vale.
 'Rowallane hybrid.' K. Burghclere, 8, Leith Vale. G. Goring-by-Sea, Northampton, 8, Wisley. S. Kew.
- Idesia polycarpa*. K. Westonbirt.
Ilex Aquifolium. K. Lamberhurst. K. & G. Hitchin, 20. B. Rednal. S. Leith Vale. U. R.B.G.E., Isles of Scilly, Kew, Westonbirt.
insignis. K. Westonbirt.
platypetala. K. Westonbirt.
rotunda. B. Cuckfield, 10.
- Illicium anisatum*. G. West Porlock. B. Kew. U. Bodnant, Burghclere, 9, Crathes, 15, Isles of Scilly. Z. R.B.G.E.
floridanum. K. Kew, West Porlock. S. Guildford. U. Bodnant, Crathes, † 3. Z. R.B.G.E.
- Indigofera decora*. B. Wisley.
Gerardiana. B. Great Amwell. S. Kew. U. R.B.G.E., † 10, Wormley Bury, † 5.
hebeptala. G. Westonbirt.
Potaninii. G. Bridgnorth, 7, Stonegate, 8. S. Burghclere, 12. U. R.B.G.E., 10, Westonbirt, Wormley Bury, † 5.
- Iris unguicularis*. B. Ludlow, Luton, 50-60. S. Burghclere, 12, Leith Vale, Watlington, 30. U. R.B.G.E., Goring-by-Sea, Isles of Scilly, Kew, †. Wormley Bury, 25.
- Itea ilicifolia*. G. Burghclere. B. R.B.G.E., 20, Leith Vale, Londonderry, 12. S. Bodnant, Goring-by-Sea, Kew, † S.W., Oxford. U. Wormley Bury, † S. 12.
yunnanensis. S. Goring-by-Sea.
- Ixia* sp. U. Hawkhurst, 3. Z. R.B.G.E.
- Jasminum angulare*. S. Isles of Scilly. Z. R.B.G.E.
humile revolutum. G. Hawkhurst. U. Kew.
Mesnyi (primulinum). G. Chard, †, Hawkhurst. B. Kew, †. S. Minehead. Z. R.B.G.E.
officinale. B. Watlington, † 40. U. Oxford, † W. 20, R.B.G.E.
polyanthum. K. Goring-by-Sea, Kew. B. Isles of Scilly, West Porlock. Z. R.B.G.E.
stephanense. K. Bridgnorth. U. R.B.G.E., † 20, Kew, Wisley, † S.
- Juniperus Cedrus*. K. Kew, Westonbirt. B. Cuckfield. U. Goring-by-Sea, Isles of Scilly. Z. R.B.G.E.
communis compressa. K. Bodorgan, 2, R.B.G.E. K. & B. Leith Vale. S. Connel, 2.
conferta. S. Westonbirt. U. Londonderry, 10. U. R.B.G.E., 8.
drupacea. B. Westonbirt.
monosperma. K. & B. Cuckfield. Z. R.B.G.E.
Oxycedrus. B. Cuckfield, 10. S. Leith Vale. Z. R.B.G.E. U. Wormley Bury, 25.
phoenicea. K. Westonbirt.
scopulorum. K. Westonbirt.
thurifera. K. Westonbirt. S. in another position.
virginiana. K. Taysnult, 6. U. R.B.G.E., 20, Goring-by-Sea.
Wallichiana. S. Westonbirt.

- Kerria japonica*. S. Leith Vale. U. R.B.G.E., † 20, Goring-by-Sea, Kew, Oxford, Uplawmoor, 9, Wormley Bury, 30.
- Kniphofia Galpinii*. K. & B. R.B.G.E. B. Kew, Leith Vale. S. Burghclere, 12, Northampton, 12. U. Goring-by-Sea, Isles of Scilly, Wormley Bury.
- Laburnum*. K. Leith Vale, 30, Sevenoaks, 40. U. R.B.G.E., Goring-by-Sea, Kew, Westonbirt.
- Lagerstroemia indica*. U. Wormley Bury, † S, 25.
- Lagunaria Patersonii*. U. Isles of Scilly.
- Lapageria rosea*. K. Burghclere, † W. 10, Goring-by-Sea, Kew. K. & B. Hawkhurst. S. R.B.G.E., 20. U. Wormley Bury, † N. 5.
- Laurus nobilis*. K. Bridgnorth, Midford. G. Basingstoke, Bradford-on-Avon, † 20, Broadway, Great Amwell, Great Chalfield, Fordwich, 10, Oxford, † S. & W. Wormley Bury, 60. B. Bignor, Binfield, Birstwith, Bramley, Burghclere, 12, R.B.G.E., Farnham, Handcross, How Mill, Thorpe-le-Soken. S. Bodnant, 80, Kew. U. Goring-by-Sea.
- Lavandula officinalis*. K. Basingstoke, 7, Hurst, 8, Luton, 4, Stratford-on-Avon, 8, Sutton Scotney, 10, Wisley. B. Claverley, Kew, Leith Vale, Oxford, Sissinghurst. U. R.B.G.E., † 10, Isles of Scilly, Goring-by-Sea, Wormley Bury, 30.
- Lavatera Olbia rosea*. K. R.B.G.E. G. Burghclere, 6, Goring-by-Sea, Leith Vale, Oxford, 2.
- Leonotis Leonurus*. K. Kew. G. Isles of Scilly, Salcombe, 10. Z. R.B.G.E.
- Leptospermum* various sp. K. Thorpe-le-Soken. G. Ardingly. B. Kew. U. Isles of Scilly.
- Boscawenii*. K. Salcombe, 15. B. Kew.
- Chapmanii*. K. Nutley, 8, Salcombe, 12, West Porlock, 15. B. R.B.G.E. in shelter, Kew.
- rupestre*. B. & S. Cuckfield. U. R.B.G.E., 14.
- scoparium Nichollsii*. K. Ash Stedham, † S. 6, Bodnant, Burghclere, † S., Benenden, Dunchidcock, R.B.G.E., Osmington, Sidmouth, 5, Teignmouth, West Porlock. B. Kew.
- scoparium prostratum*. K. Leith Vale.
- Leucadendron argenteum*. K. Isles of Scilly. Z. R.B.G.E.
- Leucocoryne ixioides*. U. Hawkhurst. Z. R.B.G.E.
- Leucopogon Fraseri*. S. Burghclere, 12, R.B.G.E., 10.
- Leucothoe intermedia*. K. Westonbirt.
- Leycesteria formosa*. B. Great Thalfield, 10, Oxford, 5. U. R.B.G.E., † 10, Kew, Uplawmoor, 7.
- Liatris spicata*. K. Uplawmoor, 2, Wisley. U. R.B.G.E., Kew.
- Libocedrus Bidwillii*. B. & S. Cuckfield. Z. R.B.G.E.
- Ligustrum Henryi*. K. Oxford, 2.
- japonica rotundifolium (L. coriaceum)*. K. Leith Vale. B. Nutley, 14, Westonbirt. U. R.B.G.E., † 10, Kew.
- Lindera cercidifolia*. U. Burghclere, 10. Z. R.B.G.E.
- megaphylla*. B. Kew, 15.
- Lippia citriodora*. K. Hirst 4, Midhurst, 6, Oxford, 2, Tydweiliog, † S., West Porlock. G. Burghclere, † W., covered bracken, 10, Castle Cary, 50, Birstwith, Minehead. B. Dunchidcock, † S. S. Brodick, † S., Handcross, 12, Kew, Sissinghurst, † S., Wareham, 15 & 20. Z. R.B.G.E.

- Liquidambar* sp. K. Campden. S. Burghclere, 9, Hitchin, 8, Leith Vale.
U. R.B.G.E., Wormley Bury, 60.
- Lithospermum prostratum* 'Heavenly Blue.' K. Leith Vale. B. Kew. U.
R.B.G.E., 6, Helsby, 10.
- Lomatia ferruginea*. K. Kew. B. Rhu, 15. U. Isles of Scilly, Salcombe,
15. Z. R.B.G.E.
- longifolia*. K. Cuckfield, Guildford. Z. R.B.G.E.
- obliqua*. K. Wormley Bury, 26.
- tinctoria*. K. Kew, Sutton Scotney, 4. U. Bodnant, Burghclere,
10. Z. R.B.G.E.
- Lonicera arborea*. K. Auldgirth, Carradale, 5, Rednal, 20.
- Hildebrandtiana*. S. Isles of Scilly.
- Ledebourii*. G. Connel. S. Oxford. U. R.B.G.E., † 20.
- nitida*. K. Oxford, where flooded. G. Chiddingfold. G. & B.
Campden. Westonbirt. B. Abingdon, Basingstoke, 10, Leyburn,
8, Stonegate, 10, R.B.G.E., 10. S. Kew, Leith Vale. U. Burgh-
clere, 14, Goring-by-Sea.
- yunnanensis*. G. Spelsbury, 15. B. R.B.G.E., 10. U. Wormley
Bury, 30.
- Lyonia macrocalyx* (*Pieris macrocalyx*). B. Cuckfield. Z. R.B.G.E.
- (To be continued)

PLANTS TO WHICH AWARDS HAVE BEEN MADE IN 1948

Callistemon salignus A.M. May 25, 1948. This decorative shrub resembles the common "Bottle-brush" but the 6-8 inch long terminal inflorescence has a greenish appearance due to the creamy-green stamens. The petals are inconspicuous and of a dull green. The stiff, grey-green leaves are aromatic. Exhibited by Sir Ralph Newman, Bt., Blackpool, Dartmouth. (See p. lxxi.)

Embothrium lanceolatum, Norquino Form F.C.C. May 25, 1948. This brilliant tree received the A.M. in 1932 and is described in the JOURNAL 58. Exhibited by Lord Aberconway, C.B.E., V.M.H., Bodnant. (See Fig. 139 and pp. 380, lxxi.)

Embothrium longifolium F.C.C. May 25, 1948. This brilliant and floriferous tree is covered with short racemes of fifteen to twenty flowers. The tube is short and the style projects beyond the gay orange, recurved petals. The leaves on the shoots are up to 10 inches long, lanceolate, varying from those on the spurs which are only an inch or two long and ovate-lanceolate in shape. Exhibited by Mr. W. J. Marchant, Keeper's Hill Nursery, Wimborne. (See p. lxxi.)

Halesia diptera A.M. May 25, 1948. A charming shrub or small tree with short, usually six-flowered, somewhat leafy racemes of white pendent flowers on 1 inch long pedicels. The leaves are elliptic to obovate, 3 or more inches long. Exhibited by Col. S. R. Clarke, C.B., Borde Hill, Haywards Heath. (See p. lxxi.)

Lilium longiflorum 'Holland's Glory' A.M. May 25, 1948. This exceptionally large form of *L. longiflorum* has up to twelve pure white flowers on the stout erect stems, each flower being 8 inches long

with a narrow tube. The leaves are 10 inches long and $\frac{1}{2}$ an inch wide. Exhibited by Messrs. van Zonneveld Bros. & Philippo, N.V., Sassenheim, Holland. (See p. lxxi.)

Moraea tripetala A.M. May 4, 1948. One of the most exquisite small Iridaceous plants from the Cape Peninsula. Grown in the cold greenhouse it produces a very slender, wiry scape a foot or so in height, occasionally with a lateral branch, and bearing a terminal 1- or 2-flowered head with narrow compressed spathes. The Iris-like flower, two inches across, lacks the usual standards, and has three spreading falls of Butterfly Blue (H.C.C. 645/3) with narrow claws and ovate blades. Exhibited by T. T. Barnard, Esq., Furzebrook, Wareham. (See p. lxxiii.)

Rhododendron amagianum. A.M. July 6, 1948. A deciduous Azalea of the sub-series Schlippenbachii making a shrub or small tree smothered in flowers $1\frac{1}{2}$ inches long of a colour near French Rose (H.C.C. 520) spotted with red and suffused with Neyron Rose (H.C.C. 6233). The flowers are arranged in threes on short, silky-tomentose pedicels. The style and the ten unequal stamens are glabrous, but the ovary is densely silky-tomentose. The leaves are rhomboid, $2\frac{1}{2}$ inches long, rugose above and slightly glaucescent. Exhibited by Lord Aberconway, C.B.E., V.M.H., Bodnant. (See p. lxxxiii.)

Rhododendron 'Damozel' (R. 'A.W. bright rose' \times R. *Grier-sonianum*) A.M. May 25, 1948. A hardy flowering shrub. Truss dome-shaped, seventeen flowered; peduncles brownish-crimson covered with scattered white glandular hairs, which also occur externally on the base of the corolla. Flowers funnel-shaped, 5-lobed, deep rose-pink with darker spotting, 2 inches long, 3 inches broad. Style and filaments deep pink, anthers dark brown. Leaves very narrowly elliptic dark green above, 5 inches long, $1\frac{1}{4}$ inches wide, covered beneath with a thin brown indumentum. Raised by the late L. de Rothschild, Esq., and shown by E. de Rothschild, Esq., Exbury, Southampton. (See p. lxxxiii.)

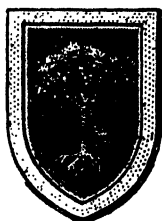
Rhododendron 'Elros' (R. *Elliottii* \times R. 'Eros') A.M. May 25, 1948. A hardy flowering shrub. Truss dome-shaped about fifteen flowered. Flowers funnel-shaped, $2\frac{1}{4}$ inches long, $2\frac{1}{2}$ inches wide with five rounded, spreading, lobes; colour rosy salmon-pink, with scattered darker spotting towards the base of the petals; style and filaments pale pink, anthers dark brown. Peduncles green shaded with dark pink and covered with scattered, small, glandular hairs. Leaves narrowly elliptic, dark matt green above, $10\frac{1}{2}$ inches long, 3 inches wide, pale green glabrous below. Raised and shown by Lord Aberconway, Bodnant, N. Wales. (See p. lxxxiii.)

Rhododendron 'Halcyone' var. 'Perdita' (R. *Souliei* \times R. 'Lady Bessborough') A.M. May 25, 1948. A hardy flowering shrub. Truss flat-topped, rather lax, containing about eight saucer-shaped 5-lobed, pink flowers, each $2\frac{1}{4}$ inches long and 3 inches across. The lobes are pale pink fading to white near the margin, each flower being marked with a few claret spots near the base of the upper petals. Filaments white, about half the length of the style, which is covered with scattered brown hairs. Peduncles pink and green with white glandular hairs. Leaves ovate, cordate, light green above, paler beneath, 5 inches long, $2\frac{1}{4}$ inches broad. Raised by L. de Rothschild, Esq., and shown by E. de Rothschild, Esq., Exbury, Southampton. (See p. lxxxiii.)

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JOURNAL OF THE ROYAL HORTICULTURAL SOCIETY

Vol. LXXIII



Part 12

December 1948

SECRETARY'S PAGE

December Meeting—The only Meeting in December is the last day of the Fortnightly Show which begins on November 30, notice of which was given in last month's issue.

Programme for 1949—The Annual General Meeting to receive the Report of the Council for 1948 and a statement of accounts for that year will be held on Tuesday, February 15, 1949, at 3 P.M. in the Lecture Room. There will also be a Show on that and the following day. The following Calendar of Meetings and Shows has been arranged:—

February 15, 16.	July 12, 13.
March 1, 2.	July 26, 27.
March 15, 16.	August 9, 10.
March 29, 30.	September 6, 7.
April 12, 13.	September 20, 21.
April 26, 27.	October 4, 5.
May 25-27 (Chelsea Show).	October 18, 19.
June 14, 15.	November 1, 2.
June 28, 29.	November 29, 30.

Any changes in this programme will be announced in future issues of the JOURNAL on this page.

Demonstrations at Wisley—The following demonstrations will be held at Wisley during 1949:—

Vegetable Garden

- March 2, 3.—Outdoor Seed-bed and Seed Sowing (2-4 P.M.).
May 11, 12.—Thinning, Transplanting and Successional Cropping (2-4 P.M.).
September 14, 15.—Harvesting and Storing (2-4 P.M.).
October 5, 6.—Digging, Trenching, Manuring and Composting (2-4 P.M.).

Fruit Garden

March 23, 24.—Spring Spraying of Fruit Trees (2-4 P.M.)

July 6, 7.—Summer Pruning of Fruit Trees (2-4 P.M.).

November 2, 3.—Planting of Fruit Trees and Roses (2-4 P.M.).

November 30 and December 1.—Pruning of Fruit Trees (11 A.M.-1 P.M.).

Flower Garden

March 9, 10.—Pruning of Roses and Shrubs (2-4 P.M.).

March 16, 17.—Seed Sowing and Vegetative Propagation of Alpines (2-4 P.M.).

June 1, 2.—Summer Pruning of Shrubs (2-4 P.M.).

August 3, 4.—Vegetative Propagation of Shrubs and Herbaceous Plants. (2-4 P.M.).

Wisley Gardens—Fellows are reminded that the gardens are closed on Sundays until March 6, 1949.

Lectures—A programme of lectures is being arranged, and their subjects and dates will be given monthly in the JOURNAL.

The Society's Examinations—Candidates who wish to enter for the Society's Examinations in Horticulture in 1949 are reminded that the closing dates for entry forms are as follows:—

GENERAL EXAMINATION IN HORTICULTURE AND GENERAL EXAMINATION IN HORTICULTURE FOR JUNIORS—Monday, January 17, 1949.

EXAMINATION FOR THE NATIONAL DIPLOMA IN HORTICULTURE (PRELIMINARY AND FINAL) AND N.D.H. (HONOURS)—Tuesday, February 1, 1949.

EXAMINATION FOR TEACHERS OF SCHOOL GARDENING (PRELIMINARY AND FINAL)—Friday, April 29, 1949.

Exhibition and Demonstration of Mechanical Appliances for use in Horticulture—The Council has decided to hold again next year, on Tuesday and Wednesday, March 29 and 30, an exhibition of mechanical appliances for use in private gardens, market gardens, fruit farms, nurseries and other horticultural establishments. It is hoped very much that this Show will be on a much larger scale than in 1947 and will demonstrate to the public the wide variety of mechanical appliances of all types on the market which will reduce the amount of labour required in the upkeep of gardens. Further details will be announced later. It is hoped to make the Show as comprehensive as possible and therefore manufacturers and others who would be willing to show appliances of this kind are requested to get in touch with the Secretary.

It is again intended to follow the Show with a demonstration of these and similar appliances on Wednesday and Thursday, April 27 and 28, at Wisley, where the machines can be seen in operation. More ground will be available this time for the demonstration of row-crop work and ploughing.

Publications—*Fruit Year Book, 1948, Daffodil and Tulip Year Book, 1948, Rhododendron Year Book, 1948*, will be available in December.

The Fruit Year Book contains some very important articles on many aspects of fruit growing including a special section on the training of fruit trees. There is an article on the selection of Pears by MR. J. M. S. POTTER, and one on "Russet Apples," by MR. P. MORTON SHAND. It is considerably larger than last year's book.

The Daffodil and Tulip Year Book contains full accounts of the Daffodil Shows, a list of new varieties and a special feature devoted to the arrangement of "Narcissi for House Decoration," by MR. FRANK GALSWORTHY.

The Rhododendron Year Book contains an account of "Rhododendrons at Tower Court," the garden of MR. J. B. STEVENSON, V.M.H., the Chairman of the Rhododendron Group, together with accounts of Rhododendrons at Rowallane in Ireland and at Wisley. The most important revision of the series of Rhododendrons by DR. J. MACQUEEN COWAN and MR. H. DAVIDIAN of Edinburgh is continued in this book which makes the Year Book of permanent importance to both growers and systematists.

The Lily Year Book will contain an index covering the 12 years during which it has been published and for this reason may be slightly delayed, but copies will be ready early in the New Year. There are articles on hybrid Lilies by COL. F. C. STERN and on Lilies at Lypiatt Park by JUDGE WOODCOCK as well as several very important contributions from America.

Only cloth-bound copies of the Year Books will be available and the price of each one will be 8s. 6d., postage and packing 9d. extra. A few copies of the 1947 Year Books are still available at the same price.

A Horticultural Who was Who by A. SIMMONDS, V.M.H.—This little book contains a reprint of the interesting articles written by the Deputy Secretary of the Society and published in the JOURNAL on the origin of many common varieties of fruit and flowers. Cloth bound, price 3s., postage and packing 6d.

The National Fruit Trials Report, 1945-47—Price 2s. 0d., post free. This is now ready and should be of interest to all fruit growers. The previous report, 1921-44, to which this present report is complementary, is also still available and the price has been reduced to 2s. 6d. post free.

A Study of the Genus Paeonia, by F. C. STERN.—A very few copies of this magnificent work are still available, price 3 guineas., plus 1s. 6d. packing and postage in Great Britain (5s. overseas).

The Rhododendron Handbook, 1947—Copies of this book are still available, price 15s., postage 6d. This contains the list of species with descriptions together with lists of hybrids, formerly published in the *Rhododendron Association's Year Book*. It has been completely revised and it is proposed to revise and republish this handbook every five years.

Botanical Magazine—The four parts of the first volume in the new series have been issued during 1948 and copies are still available with plates printed in four colour half-tone at the subscription rate of £4 per annum or 1 guinea per part, post free. It has now been arranged that the plates of the 1949 Volume should be printed in colourgravure by The Grout Engraving Co. Ltd., and they will be similar to the plates in *A Study of the Genus Paeonia*, which were printed by the same firm.

Journal Binding—It has been arranged that Fellows' copies of the JOURNAL may be bound in green cloth with gold lettering and crest at a cost of 8s. 6d. each volume plus 1s. for return postage and packing. Parts for binding should be sent, with remittance, to Mansell (Bookbinders) Ltd., 31-34 Cursitor Street, Chancery Lane, E.C. 4. The parts should not be sent to the Offices of the Society.

WISLEY IN DECEMBER

DURING this month most of the flowering plants will be found in the glasshouses, but if the weather is kind some of the choice winter-flowering shrubs will be in bloom outside. The most distinctive among these will undoubtedly be the sweet-scented, yellow-flowered *Mahonia japonica*. It is protected from the cold by the overhanging trees in the Wild Garden, and along the main walk by the large specimens of *Magnolia grandiflora*. Also flowering throughout the month is *Viburnum fragrans*, which was cultivated in Chinese gardens for many years before its introduction to England in 1914-15. A large specimen at Wisley grows in the Award of Garden Merit Collection, while others are to be found in the Wild Garden growing in the damp, thinly-shaded conditions which suit this plant. Two related species, both Himalayan, may be flowering now, the pink *V. grandiflorum*, with larger flowers than *V. fragrans*, and the white-flowered *V. foetens*, which this year opened its first flowers in late September against the wall of the Laboratory.

In Seven Acres the evergreen hybrid *Arbutus* × *andrachnoides* gives evidence of the winter-flowering habit of one of its parents, *Arbutus Unedo*, as the white blossoms appear early in the month. Nearby, in the Heath Garden, the mass of bloom has passed when, in the short winter days, the varieties of *Erica carnea* and the popular hybrid, *Erica* × *darleyensis*, open the first of their blossoms. This group is always a favourite of the gardeners on calcareous soils as its accommodating tolerance of lime enables it to flourish where other Ericaceous plants fail. Throughout the shrubberies the Cotoneasters and Berberis will predominate in the last blaze of "Autumn" colours, many of them, like *C. pannosa* and *G. glaucophylla*, not attaining their brightest hues until this month. In the vast family of Berberies many lovely variations can be seen in both form and colour, the purple berries of KINGDON-WARD'S introduction, *B. gyalica*, and the deep scarlet and pink of *B. Dielsiana* and *B. Prattii* contrasting with the black fruits of *B. wisleyensis*.

Wandering in the Pinetum the true beauty of the Conifers is realized by many visitors as the deciduous trees scatter their leaves and the

distinctive bark of the seldom-planted *Prunus Maackii* stands out from the dark colours of the evergreens. Amid the trees the blue-grey of *Chamaecyparis (Cupressus) Lawsoniana* 'Triomphe de Boskoop' and var. *Allumii* is happily associated with the yellow-tipped *C. obtusa* var. *Crispii* and the reddening tinge of *Cryptomeria japonica* var. *elegans*. Further along the walk can be seen the heavily coning Indian Pine, *Pinus excelsa*, and behind it one of the few hybrid pines *Pinus* \times *Holfordiana* (*P. Griffithii* \times *Ayacahuite*).

In the Half-Hardy House, climbing up a support, is *Calceolaria Pavonii* with its bright yellow flowers contrasting with the blue of the nearby *Lithospermum rosmarinifolium*. Flowers of the shrubby *Antirrhinum speciosum* and of *Fuchsia microphylla* will still be showing as *Narcissus Tazetta* var. *Panizzianus* comes into bloom. Further down the range of glass, in the Temperate House, as the month closes, the Acacias, led by the species *A. adunca*, will start showing clusters of yellow-stamened flowers. Many other Australian plants can also be seen, including the Correas and the Australian Heaths (*Epacris*) which decorate the staging along each side. Another pot-plant that will attract attention is *Coleus thyrsoideus*; its bright blue flowers and pale green foliage are especially valuable at this time of the year. Unfortunately the key feature of its culture is a regular temperature of 70° F. and it is therefore difficult for many amateurs to grow successfully. One of the most reliable and vivid winter-flowering shrubs in the house is *Tibouchina semidecandra* which produces its dark violet flowers for so long a period at this season. Its luxuriant growth, so typical of Brazil, its native habitat, is only curtailed by drastic pruning as the last of its blooms are scattered on the ground.

The sweet scent which often fills the house comes from the almost tree-like *Buddleia asiatica* whose drooping branches are covered with long panicles of white flowers. Nearby is a striking African plant which is often used for pot work, *Sparmannia africana*. Its foliage is large and softly pubescent; the whiteness of its petals is relieved by the yellow and purple-tipped stamens.

Throughout the year, which is drawing to a close, much has again been accomplished to bring the Gardens back to their high peace-time standard. One of the main tasks has been the complete repainting—inside and out—of the range of glasshouses, the replacement of many of the old iron benches with new concrete staging, and the overhaul of the entire heating system. In the contents of the houses changes have also taken place. For example, the house in which until recently the White Fly parasite was bred has reverted to ornamental plants, and in one of the sections there is now a selection of tender aquatics and stove plants.

Large numbers of Rhododendrons and Camellias have been propagated and on Battleston Hill preparations have been made to accommodate these collections. From the lovely display of hybrids during the early months of the year visitors can visualize the magnificence of the scene as the newly planted sections reach maturity.

Many new plants have been added to the collections in the Gardens. The most notable of these is undoubtedly *Metasequoia glyptostroboides*, the deciduous Conifer recently discovered in Western China (see

JOURNAL, July 1948). In February the first sowing germinated and in its first year it has grown 18 inches with a somewhat spreading habit. At present most of the plants are over wintering in the cool house until the spring when large-scale out-door plantings will be attempted. In the meantime one or two of the young plants are being tried outside as a preliminary test of hardiness. A fine gift of *Calanthes*, which includes *C. Harrisii* and many hybrids, is also new to Wisley. This month visitors will find them in flower in the new stove house. Also sheltering during the winter are seedlings of species of *Eucalyptus* sent to the Society from Tasmania with the intention of testing the relative hardiness of various members of the genus in this country.

Although it is risky to adjudicate on such a point, probably the most popular plant of the year has been *Verbena* 'Lawrence Johnston.' Throughout the months of June to October this fine red form has bloomed profusely in its sunny position in front of the Curator's House near the main gate (Fig. 165). The history of this *Verbena* is dealt with in an illustrated note in a recent issue of *The Gardeners Chronicle* (ser. 3, vol. CXXIV, p. 101).

A NOTE ON *KOLKWITZIA AMABILIS* IN DENMARK

IN Part 9, p. 307 of this JOURNAL a note on *Kolkwitzia amabilis* is found which points out that the results in cultivating this very beautiful shrub "have not been very striking." It may perhaps, therefore, be of some interest that a specimen planted about eighteen years ago in my garden in Hellebaek, north of Elsinore, has been very successful. It now forms a bush about six feet high and equally wide, with spreading branches and branchlets bent gracefully downwards, and every year in the months of June and July it is densely covered with its beautiful rosy red flowers. In autumn it assumes a fine autumnal colouring.

The shrub is planted between two large stones in a somewhat elevated position. The soil consists of meagre sandy loam in a sloping lawn. The position is open and sunny; it has not been artificially watered and has never had any manure.

In the extraordinary severe winters during the war, especially the last one in 1941-42, when the temperature dropped to -32° C., many trees and shrubs in the garden were killed, but *Kolkwitzia* did not suffer at all.

The shrub was introduced here in Denmark in 1928 by the owner of the nursery 'Braendkaerhøj' near Koldong, MR. AXEL OLSEN, from whom I received my specimen a few years later. It is now found, even if not very frequently, in many gardens in Denmark, and seems in most cases to thrive easily.

F. BÖRGESEN
Hellebaek, Denmark

MASTERS MEMORIAL LECTURES, 1948

NUTRITION PROBLEMS OF HORTICULTURAL PLANTS, WITH SPECIAL REFERENCE TO TRACE ELEMENTS

T. Wallace, C.B.E., D.Sc.

PART II

(DR. H. V. TAYLOR, C.B.E., V.M.H., *in the Chair*)

THE IMPORTANCE OF DIFFERENT ELEMENTS FOR DIFFERENT CROPS

IN considering the conditions under which deficiencies and excesses of mineral nutrients occur, it is important to stress the special nutrient needs of different plants and their behaviour under different conditions of nutrient supply.

This is an aspect of the subject which still requires detailed systematic study though there is a large body of information already available concerning many of our horticultural plants. Regarding the systematic aspect it will suffice to state that particular nutrient requirements can be related to many genera and species, although within a given species there may be outstanding instances of varieties with very special manurial needs. Thus most members of each of the genera, *Brassicae*, *Graminae* and *Leguminosae*, show great similarity in mineral requirements (see below) as do most members of *Pyrus* and *Citrus* species, whilst those among you who have studied varieties of fruits in detail will know how important it is to learn the special needs of some of them to achieve success, e.g. among Apples the high susceptibility to potassium deficiency of 'Cox Orange Pippin,' 'Grenadier' and 'Beauty of Bath.' The following list provides examples of particular nutrient needs of different crops.

Examples of high requirements :

Brassicae. Nitrogen, phosphorus, calcium, magnesium, boron.

Legumes. Phosphorus, calcium, potassium, boron, manganese.

Fruit Crops.

Apples. Potassium, magnesium, iron, manganese, zinc, boron.

Citrus. Nitrogen, calcium, magnesium, zinc.

Pear. Iron.

Black Currant. Nitrogen.

Raspberry. Potassium, iron, manganese.

Strawberry. Phosphorus, iron.

Tomato. Nitrogen, phosphorus, calcium, magnesium, potassium.

Vegetable Crops.

Potato. Potassium, calcium, magnesium, phosphorus, manganese.

Pea. Phosphorus, calcium, manganese.

*Vegetable Crops—continued.**Carrot and Parsnip.* Potassium.*Cauliflower and Broccoli.* Nitrogen, phosphorus, calcium, magnesium, potassium, boron.*Celery.* Nitrogen, calcium, potassium, boron.*Beetroot.* Manganese, boron.

It is also well known that horticultural plants are sometimes grouped into the two classes of Calcicoles, lime-inhabiting species intolerant of soil acidity, and Calcifuges, intolerant of calcareous soils. Important factors in deciding this grouping may well be the requirements of the plants for and tolerances of particular mineral nutrients.

Thus calcicoles grow under conditions of good supplies of calcium and also frequently of magnesium, potassium and phosphorus, and of relatively low amounts of the trace nutrients iron and manganese, and of hydrogen ions and aluminium. In experiments at Long Ashton it has been shown that plants susceptible to soil acidity may fail in acid soils from different causes. Thus the Brassicae seem particularly susceptible to high manganese and low calcium, Celery to high aluminium and low calcium, Sugar Beet and Leek tolerate high concentrations of manganese but are very sensitive to high aluminium, whilst Potato is tolerant of high concentrations of both manganese and aluminium, but cannot survive if calcium supply is low. Moreover, the experiments have shown that failures resulting from aluminium excess may be due to an induced deficiency of phosphorus. Calcifuges, on the other hand, flourish at low levels of the basic elements, particularly of calcium, and generally at relatively high levels of iron, and must tolerate or even require high concentrations of hydrogen ions, manganese and aluminium. These last two elements it may be noted are remarkable for the way in which they are accumulated by special plants, in which they may occur in concentrations of several thousand p.p.m. calculated on dry matter basis.

In connexion with the problem of tolerance of mineral nutrients, plants appear to possess defence mechanisms both to prevent the absorption of specific nutrients and to deal with excessive concentrations within their tissues (1, 2).

Thus in an experiment at Long Ashton with different fruit plants growing together on the same plot and manured with muriate of potash

TABLE I

SHOWING CHLORINE ACCUMULATION IN FRUIT PLANTS FROM FERTILISER DRESSINGS

Fertiliser Dressing	Apple		Black Currant		Gooseberry		Raspberry		Red Currant	
	% Cl in Dry Matter	Cl as % in No Potash Sample	% Cl in Dry Matter	Cl as % in No Potash Sample	% Cl in Dry Matter	Cl as % in No Potash Sample	% Cl in Dry Matter	Cl as % in No Potash Sample	% Cl in Dry Matter	Cl as % in No Potash Sample
Kainit . .	0.15	79	0.61	87	0.45	168	1.09	248	2.00	377
KCl . .	0.12	63	0.63	90	0.39	139	0.88	200	1.54	291
K ₂ SO ₄ . .	0.12	63	0.50	83	0.27	96	0.41	93	0.77	145
No Potash . .	0.19	100	0.70	100	0.28	100	0.44	100	0.53	100

and kainit it was found that Apples and Black Currants were not affected by the chloride of the fertilisers whilst Red Currants were severely injured. Analysis of the foliage showed that the Red Currants had absorbed large amounts of the chloride ion whereas the chloride contents of the Apple and Black Currant foliage were similar to those of comparable plants manured with sulphate of potash and given no chloride treatment.

Again, if the proportions of various nutrients in the different organs of plants are compared it will be found that certain elements are concentrated in or excluded from particular tissues. Thus calcium is generally present in high proportions in leaves, but the amount is always very low in fruits and seeds. By contrast, phosphorus and magnesium are important elements in the ash of seeds.

TABLE II

ASH AND ASH CONSTITUENTS OF LEAVES, STEMS AND FRUITS OF GOOSEBERRY

	As % of Dry Matter				
	Ash	CaO	MgO	K ₂ O	P ₂ O ₅
Leaves	8.64	3.36	0.49	2.69	0.70
Stems	5.64	5.31	0.60	3.99	1.60
Fruits (Pulp and Seeds)	3.83	1.33	0.80	12.09	4.13

METHODS OF DETERMINING THE MINERAL STATUS OF PLANTS

In attempting to determine the mineral status of plants two methods of approach to the problem immediately suggest themselves as likely to yield fruitful results—the examination of the plants themselves and of the soils in which they are growing. The methods which have been evolved are, in actual fact, based on both plants and soils, and, as will be seen later, are both varied and comprehensive in character.

The main methods may be classified as follows: visual diagnosis; foliage spraying and tissue injection; chemical analysis of plants or of special plant organs; soil analysis, utilizing chemical methods, and including chemical solutions, plants and micro-organisms as means of extracting mineral nutrients from the soils; pot cultures, including sand and soil cultures; field trials, usually in the form of manurial experiments.

From the following discussion of these methods it will be evident that some of them can be used by the practical gardener without the use of special apparatus, whilst others, especially those involving chemical determinations, are highly technical and can only be used by trained specialists. It should also be noted at the outset that no one method used alone will solve all the problems of mineral status, although many practical problems of deficiency and excess in horticultural plants can be solved by tests available to the practical grower, whilst the experts who can use all the methods should be able to solve most problems of mineral nutrition by using suitable combinations of the methods.

Visual diagnosis. In this method use is made of the visible effects

which are shown by plants as the result of deficiencies and excesses of mineral nutrients. As has been mentioned previously in these lectures these effects for any given deficiency or excess in any plant are sufficiently characteristic to enable them to be used for diagnostic purposes. Moreover, for each element certain symptoms are often characteristic for a wide range of plants which renders possible a considerable amount of classification of symptoms, though in the practical use of the method for a wide range of plants it will have been evident from the descriptions already given that many effects cannot be fitted into a scheme of broad classification and must be learned in detail. I would refer those who are interested in this method to my book "The Diagnosis of Mineral Deficiencies in Plants by Visual Symptoms" (3) which gives a detailed description of the method and its use in the field, and also includes a comprehensive colour atlas showing the effects of deficiencies and excesses of mineral nutrients on a wide variety of crop plants.

This method is essentially one which can be applied by observant gardeners who will take the trouble to study plant symptoms in detail, though I would issue the warning that skill in its use will not be acquired without considerable study and experience. It should be noted that the accuracy and effectiveness of the method will generally be increased by combining it with foliage spraying and plant injection treatments whilst results can often be checked by appropriate manurial tests.

In dealing with difficult problems by the method of visual diagnosis, use is often made of special "indicator" plants, which are plants that show the effects of particular deficiencies or excesses in striking and characteristic fashion, and at the same time are especially susceptible to them. They are particularly useful when growing near other crops that show uncertain effects or for which the suspected deficiency or excess has not been studied. Indicator plants are also used to great advantage in so-called "indicator plots" which are used to determine, in advance, the possibilities of nutrient disorders occurring on land of unknown cropping potentialities (3).

On these plots the special indicator plants are grown side by side in strips that are crossed by appropriate fertilizer and lime treatments. The following table (III) gives a list of garden crops that may be used as indicator plants for common deficiencies. The table is not exhaustive and horticulturists growing their own special crops should be able with experience to select indicators particularly suitable for their own requirements.

As a preliminary to using the visual method it will generally be useful to make a rough colorimetric soil test for pH to determine whether the soil is acid or alkaline as this will often narrow down the problem considerably. For instance, so far as trace elements are concerned, deficiencies of iron and manganese are only likely to occur under alkaline conditions whilst toxicities of manganese and aluminium will only be found on strongly acid soils.

Foliage spraying and tissue injections. These methods are based on the fact that plants readily absorb mineral salts into their tissues from solutions of suitable strengths, applied either as sprays on the leaves or injected into leaves, stems and other organs, or from solid salts injected

TABLE III
GARDEN CROPS SUITABLE AS INDICATORS

Suitable Indicator Plants	Special Mineral Deficiencies Shown
VEGETABLE CROPS Cauliflower, Broccoli	NITROGEN, CALCIUM, MAGNESIUM, iron, phosphorus, potassium, boron.
Potato	POTASSIUM, MAGNESIUM, phosphorus, manganese.
Globe Beet	BORON, MANGANESE.
Swede, Turnip	PHOSPHORUS, BORON, calcium, magnesium.
Peas	MANGANESE
FRUIT CROPS Black Currant	NITROGEN, calcium.
Plum, Pear	NITROGEN, IRON
Apple	POTASSIUM, MAGNESIUM, BORON, iron, manganese
Sweet Cherry	MANGANESE
Gooseberry	POTASSIUM, magnesium, phosphorus
Raspberry	IRON, MANGANESE, potassium
Strawberry	PHOSPHORUS, IRON

Elements for which the crops are specially recommended are shown in block capitals: other elements for which they are also useful in ordinary type.

into stems and branches. Whilst the methods may be used for all nutrients, they are particularly applicable for trace elements.

To use these methods it is necessary to know the appropriate strengths of the solutions for the various elements and the suitable doses to inject into the tissues, otherwise the treatments may cause damage or be ineffective. The time in the growth cycle at which the treatments are given is also important and, as a general rule, for sprays and solution injections the treatments should generally be given early* during the active period of growth whilst for solid injections the dormant period, just prior to renewal of growth, is usually best as it minimizes the risks of damage.

The results from foliage spraying and solution injections are usually apparent after 7 to 14 days, whilst dormant season sprays and solid injections are effective immediately growth begins.

The methods of injecting various organs have been described in detail in a special publication by DR. ROACH of East Malling Research Station (4).

Chemical analysis of plant organs. Many unsatisfactory conditions of mineral status in plants, particularly deficiencies and excesses, are reflected in the mineral composition of special organs, though here again chemical composition is not an infallible guide. It has been found by experience that the laminae and petioles of leaves are generally the most suitable parts of the plants for analysis although stems are also often useful. For some purposes the roots may provide the most suitable index, for example, as a guide to aluminium toxicity. In the main,

* Manganese to prevent Marsh Spot in Peas is an exception. For this purpose the spray should be applied at the flowering stage. Zinc sprays for fruit trees are also most effective when applied during the dormant seasons.

however, leaves are most often used and, as the method generally entails comparisons between healthy and unhealthy plants, it is essential that the materials used are strictly comparable. In this connexion it has been found that the various elements show well-defined gradients within plants, increasing or decreasing from younger to older tissues, *e.g.* potassium and magnesium tend to decrease in concentration in passing from the younger to older leaves on a stem whilst the reverse is true of calcium and boron. Again, most elements show obvious cycles for any given part of a plant during the growth period; thus nitrogen and phosphorus show steady decreases in leaves and stems in passing from the early to the late stage of seasonal growth, whilst magnesium shows little change and calcium shows a progressive increase.

Two notable limitations of the chemical method may be mentioned. Thus iron status may not be reflected by plant analysis and indeed where a deficiency of the element is induced by toxic concentrations of other metallic compounds, such as of zinc, the plants may show excessively high concentrations of iron, which is apparently immobilized in the tissues.

Again, where two elements which exercise antagonistic effects on one another, *e.g.* potassium and magnesium, are both deficient in supply, an acute deficiency of one may mask the deficiency of the other. This effect can be seen in the data in Tables IV and V where the values for MgO are high on the "no manure" and "potassium omitted" plots, but at deficiency levels where potassium is given.

Examples illustrating the usefulness and limitations of chemical analysis are provided in Tables IV, V and VI.

In connexion with chemical methods mention must be made of the special methods which have been applied to speed up the tedious routine previously involved in making full chemical analysis of plant tissues. Thus special apparatus, such as the spectrograph and the polarograph, is being used to make quick and comprehensive analyses of

TABLE IV
MANURIAL EXPERIMENT ON POTATO. CHEMICAL ANALYSIS OF LEAVES

Manurial Treatment	Block I					Block II*				
	As % Dry Matter				As p.p.m.	As % Dry Matter				As p.p.m.
	CaO	MgO	K ₂ O	P ₂ O ₅	Mn	CaO	MgO	K ₂ O	P ₂ O ₅	Mn
No manure	7.24	0.94	0.56	0.86	35	6.03	1.32	0.86	0.63	52
Stable manure	5.59	0.89	5.01	0.79	30	4.46	1.23	4.81	1.31	30
N.P.K. fertilizer	4.73	0.40	4.35	1.00	52	4.62	0.96	4.72	1.00	36
P.K. fertilizer (N omitted)	4.74	0.33	5.42	0.88	40	4.05	0.92	4.15	0.99	34
N.K. fertilizer (P omitted)	4.72	0.73	4.26	0.46	32	4.97	1.11	4.34	0.36	40
N.P. fertilizer (K omitted)	7.04	1.86	0.63	1.26	55	7.66	1.86	0.71	1.34	65

* Note.—All plots in this block receive magnesium sulphate in addition to the other treatments.

TABLE V

MANURIAL EXPERIMENT ON BLACK CURRANT. CHEMICAL ANALYSIS OF LEAVES

Plot No.	Manurial Treatment	Dry Matter in Fresh Weight %	Ash in Dry Matter %	Ash Constituents as % Dry Matter				Total Nitrogen in Dry Matter %
				CaO	MgO	K ₂ O	P ₂ O ₅	
A ₁	No Manure	35.9	12.73	5.70	0.43	0.84	0.57	2.67
A ₂	do.	35.1	12.28	5.50	0.57	0.77	0.59	2.90
A ₃	do.	36.7	11.79	5.30	0.54	0.78	0.62	2.76
B ₁	Dung	35.8	11.41	4.56	0.71	1.51	0.71	2.86
B ₂	do.	35.4	11.59	4.60	0.44	1.45	0.75	3.05
B ₃	do.	34.5	11.45	4.48	0.44	1.57	0.96	3.08
C ₁	Complete Artificials	36.4	11.03	4.40	0.30	1.68	0.56	3.02
C ₂	do. (NPK)	36.1	11.01	4.56	0.32	1.64	0.57	3.05
C ₃	do.	35.4	11.23	4.46	0.28	1.65	0.57	3.16
D ₁	Complete Artificials,	34.3	11.79	4.76	0.22	1.60	0.58	3.02
D ₂	do. less N (PK)	35.7	11.79	4.72	0.23	1.57	0.61	2.84
D ₃	do.	35.5	11.12	4.40	0.19	1.66	0.61	2.97
E ₁	Complete Artificials,	34.9	11.24	4.75	0.29	1.79	0.53	3.04
E ₂	do. less P (NK)	35.2	10.37	4.07	0.27	1.85	0.55	3.14
E ₃	do.	35.3	10.43	4.12	0.34	1.73	0.55	3.08
F ₁	Complete Artificials,	35.1	12.81	6.02	0.51	0.65	0.67	2.94
F ₂	do. less K (NP)	35.5	12.94	6.03	0.75	0.65	0.69	2.88
F ₃	do.	35.4	12.80	5.96	0.63	0.66	0.74	3.00

mineral status and is proving very valuable, though the apparatus required is somewhat elaborate and expensive.

Another development is the method of chemical tissue tests in which mineral nutrients are extracted from the plant tissues, generally petioles and stems, by chemical solvents and subsequently estimated by special colour tests. This method, though empirical in character, has proved excellent in practice when procedure is carefully standardized, and has the advantage that it can be used as a field method (5).

Some workers have developed special diagnostic procedures based on chemical methods, a notable example, which was first used in France

TABLE VI

EFFECT OF ZINC TOXICITY ON IRON ACCUMULATION IN PLANTS

Crop	Healthy		Chlorotic	
	Iron p.p.m.	Zinc p.p.m.	Iron p.p.m.	Zinc p.p.m.
Wheat	140	20	500	370
Oats	150	10	930	560

and later in U.S.A., being known as the Method of Foliar Diagnosis (7). In this method a series of tests on a selected organ of a given crop is made during the growth season and determinations made of a number of nutrient elements, usually three, to determine total amounts, relationships and seasonal trends. This method aims at providing both a quantitative and qualitative index of nutrient status.

Typical data obtained by this procedure are shown in the following diagram from an experiment on maize.

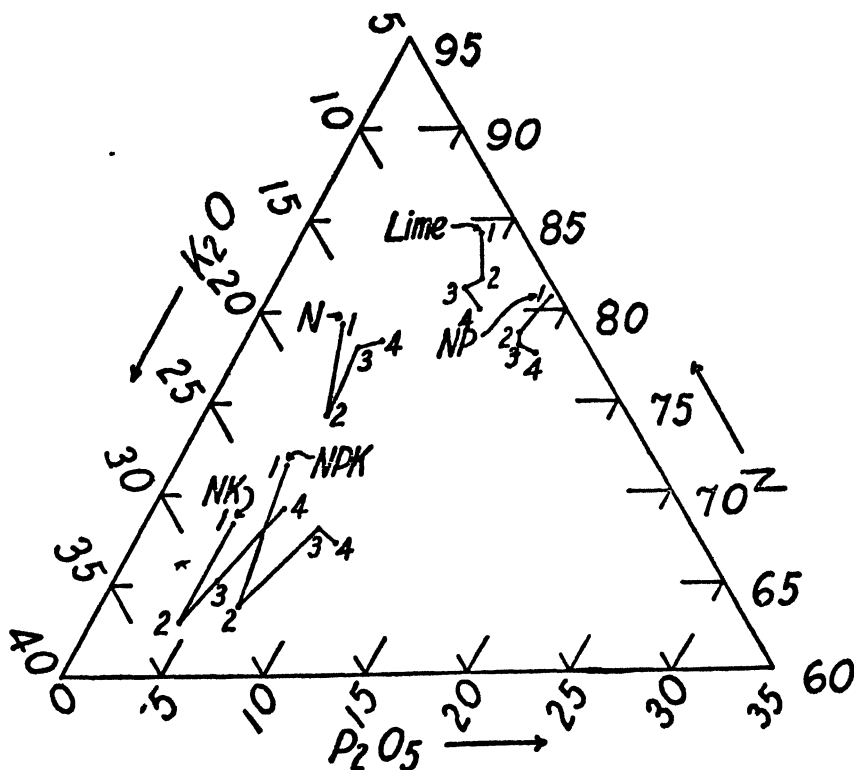


FIG. 1—Foliar Diagnosis Diagram (From W. Thomas and W. B. Mack)

Changes during the growth cycle in the $N-P_2O_5-K_2O$ equilibrium in the third leaf. Numerals indicate the co-ordinate point of the NPK-unit at the respective dates of sampling. Treatments are [N], [NP], [NPK], [Lime].

In this experiment, plot yields were obtained for the four nutrient treatments shown and the mineral status of the third leaf of representative plants shown on the diagram as $N-P_2O_5-K_2O$ units for four dates during the growth cycle, viz. July 6, 21 and August 8, 25. By joining the points on the graphs for the four dates for any one treatment the seasonal mineral trend for the treatment is obtained. By comparing the respective graphs with the yields from the corresponding treatments, it is possible to associate high or low yields with values for the $N-P_2O_5-K_2O$ units during the growth period.

A useful graphic method of representing the mineral balance in plant tissues has been used by D. J. D. NICHOLAS at Long Ashton. This

method can be adapted to study the relationships of any number of elements under varying conditions of nutrition (Fig. 2).

In this method the units for each element are marked off along lines radiating from a central point. When the elements are well balanced the figure produced by joining the points on each line is 'regular sided' e.g. in Fig. 2 a regular pentagon would result.

The use of plant analysis as an index of mineral status of plants has been fully discussed in a recent publication by GOODALL and GREGORY (8).

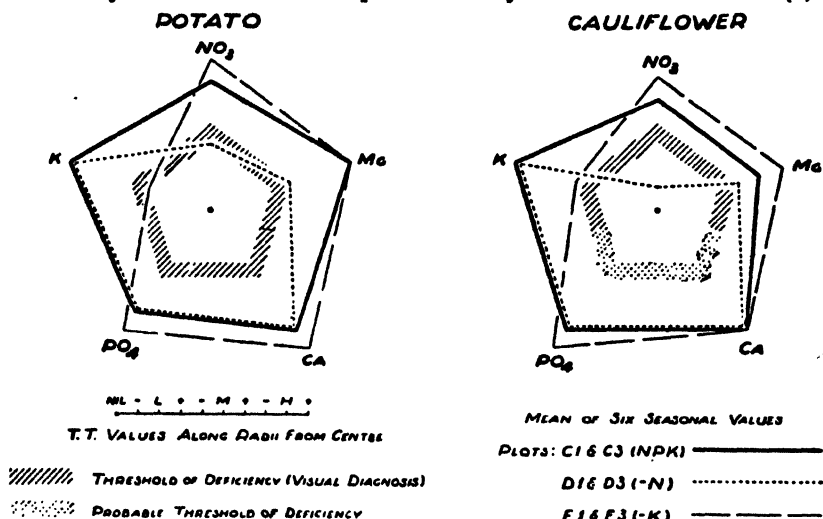


FIG. 2—Diagram illustrating Mineral Balance. (From Data of D. J. D. Nicholas)

Soil analysis. Soil analysis is used in problems of crop nutrition in two ways, viz. (a) to explain the reasons for crop failures and (b) to attempt to foretell whether the mineral status of any particular crop is likely to be satisfactory on a particular soil. Since all soils usually contain sufficient quantities of mineral nutrients to supply the needs of crops grown on them for many years, the critical problem in soil analysis is to determine the likely "availability" of the different nutrients for the crops to be grown.

The methods used are essentially empirical since only the crop growing under the particular conditions existing during its growth period can give the correct answer to the problem of availability. Nevertheless very useful soil methods have been developed, but unfortunately, so far, these have been generally restricted to nitrogen, potassium, phosphorus, carbonate of lime, acidity and organic matter. Since there are at least twelve essential elements, in addition to which there are others which are beneficial and others which may produce toxic effects, it will be seen that soil analysis in its present form does not provide the answer to every problem which arises in practice.

Most soil chemists of experience have evolved their own special techniques to establish "availability" standards for the particular soils and crops with which they are concerned and it must be emphasized that skilled interpretation of results is an essential feature of soil analysis methods. Thus to find that a soil is acid is not to say that the soil chemist

will advise lime—he would not, for example, advise liming a soil with pH 5.5, which is fairly strongly acid, for a Potato crop, though he would do so for a garden soil on which a rotation of vegetable crops, including the inevitable Brassica crops, was to be followed. Or again, if available potassium is low this may be unimportant for many Brassicas, but for Potatoes and many fruit crops such a condition would cause failures unless corrected by potash fertilizers. The lesson to be learned is that the method is essentially one for the expert, and the practical horticulturist should realize that soil analysis, although useful, can only provide indications of probable or general nutrient requirements and that the results require expert interpretation.

So far as trace elements are concerned soil methods have not yet been very informative, although MITCHELL (9) and others have applied chemical methods successfully to special problems and MULDER (10) has developed useful microbiological methods for magnesium, copper, zinc and molybdenum. (See also Fig. 163.)

For a full description of the various methods used in soil analysis reference should be made to text-books and publications, such as those of PIPER (11), WRIGHT (12), and STEWART (13).

Pot Culture Methods. Pot cultures, including sand and solution cultures, may be used to determine the effects of factors concerned in mineral nutrition under conditions allowing of considerable control of the plant environment. Since the complete “diet” of mineral nutrients may be provided by means of highly refined chemical compounds it is possible to create deficiencies and excesses of nutrients and to study these under conditions of controlled acidity or alkalinity. In actual fact the method has been used to provide the basic data for the method of visual diagnosis, both for deficiencies and excesses, for studying the effects of varying ratios of nutrients, and for analysing the complex effects of the factors concerned in soil acidity.

The method is also of fundamental importance in the search to establish the essentiality of further elements as plant nutrients.

The exacting nature of this latter work is exemplified in the publications of HOAGLAND and his colleagues in California (14, 15), PIPER in Australia (16), and HEWITT (17) in England.

Field Trials. The method of field trials for the determination of the mineral requirements of crops is a very old one and its value was clearly demonstrated in this country more than 100 years ago in the classical experiments of LAWES and GILBERT at Rothamsted.

The method must always be regarded as a final test of nutrient requirements, but nevertheless, in carrying out field trials, there are certain pitfalls which must be avoided, whilst for diagnostic purposes it is not always convenient or efficient. Thus certain chemical elements when applied to the soil may act indirectly on the nutrient status of crops, an outstanding example being sulphur which increases the acidity of the soil and may cure deficiencies of iron and manganese by increasing their availability. Again, certain elements, such as K, Mg, P, Fe and Mn, when applied in fertilizers to remedy deficiencies on soils with strong “fixing” powers for them may be either wholly ineffective on crops or so slow in action for the conclusion to be formed that they are not deficient. These conditions have occurred frequently in experiments



Photo, N. K. Gould

NEW AND NOTEWORTHY PLANTS

FIG. 154—A new *Rhododendron* species, *Rhododendron Aberconwayi* (See p. 438)



Photos S. E. Downward

CONIFERS ON SHOW

FIG. 155—*Abies venusta* in cone

From an exhibit of Conifers from the Tilgate Research Station to which a Gold Medal was awarded on September 21, 1948. This is sometimes grown under the name *Abies bracteata*



CONIFERS ON SHOW

FIG. 156—*Pinus Wallichiana*. This is sometimes grown under the name *P. excelsa*



Photos Long Ashton Research Station [A]

[B]

NUTRITION PROBLEMS OF HORTICULTURAL PLANTS

FIG 157, top CAULIFLOWER PLANTS

Left Calcium deficiency, *Right* Manganese excess

Cauliflower is highly susceptible to these two factors on acid soils

FIG 158, bottom CELERY PLANTS

[A] Calcium deficiency—note death of growing point

[B] *Left* Excess manganese, *Right* Excess aluminium

Celery is highly susceptible to calcium deficiency and to aluminium excess, but resistant to manganese excess (*cf* Fig 160)



NUTRITION PROBLEMS OF HORTICULTURAL PLANTS

FIG. 159. SUGAR BEET PLANTS—damage from excesses of trace elements

Top. Copper. *Lower:* Zinc.

In both instances two effects are produced: chlorosis due to an induced deficiency of iron, and death of tissues.



FIG 160, Left MARROW STEM KALE

Left Manganese excess , *Right* Aluminium excess

Like other Brassicae, Kale is highly susceptible to manganese excess on acid soils

FIG 161, Right FIELD OUTFIT FOR CHEMICAL TISSUE TESTS

The outfit comprises reagents in special bottles fitted with graduated pipettes , hydrometer for weighing plant material, beakers, specimen tubes for making colour tests, and standard colour discs for assessing colours produced in tests.



NUTRITION PROBLEMS OF HORTICULTURAL PLANTS

FIG 162 POT CULTURE GREENHOUSE AT LONG ASHTON

Showing a variety of pot cultures in sand and chemical containers for nutrients

FIG. 163, top left. ASPERGILLUS METHOD OF SOIL TESTING *Magnesium*.

Results of tests on soils from plots referred to in Table IV. Aspergillus test indicates plots receiving N P K. and N P treatments, Block 1, to be both deficient in magnesium. Chemical test on plant tissue for N P treatment fails to show the deficiency.

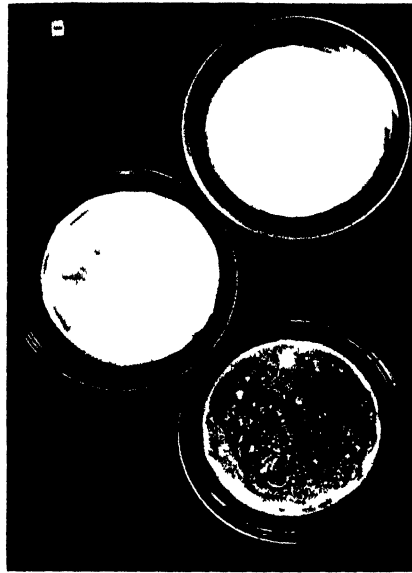


FIG. 164, top right. POTATO—Calcium deficiency

Sprouting tubers, showing death of shoot tips.



FIG. 163, bottom left. ASPERGILLUS METHOD OF SOIL TESTING *Copper*:

Left: Normal soil

Right: Copper deficient soil

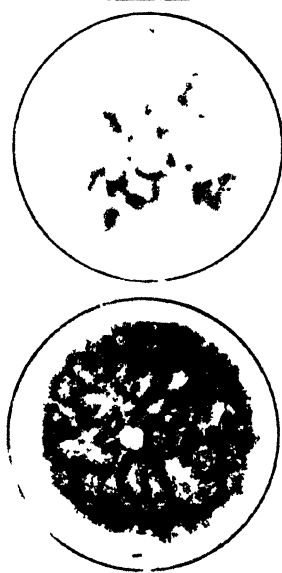


FIG. 164, bottom right POTATO—Calcium deficiency

Tubers showing malformed and dwarfed specimens. Potato is highly susceptible to calcium deficiency in relation to shoot and tuber formation. Slight deficiency effects only occur on strong acid soils (below



FIG 165—*Verbena* 'Lawrence Johnston' at Wisley (See p 422)

with fruit crops and in problems of magnesium deficiency of Tomatoes, and may be expected to apply in many problems involving trees and shrubs. The recognition of such effects has in recent years led to many experiments on so-called "fertilizer placement," which idea may be extended to include various other methods of introducing mineral nutrients into plants, *e.g.* placing fertilizers in the soil near seeds and roots instead of the usual broadcast methods of application, foliage spraying, stem injection and seed soaking with chemicals. By placing phosphates with the seed of cereals in "combine drills" the general result on deficient soils has been to double the efficiency of phosphate dressings, *e.g.* $1\frac{1}{2}$ cwt. phosphate drilled equals 3 cwt. phosphate broadcast, whilst in some experiments with potash on barley on acutely deficient chalk soils $\frac{1}{2}$ cwt. of muriate of potash drilled with the seed was as effective as 2 cwt. broadcast. Again, in experiments on magnesium deficient Tomatoes a total of 5 cwt. of magnesium sulphate, applied as a 2 per cent. foliage spray on five occasions, was always more efficient than 20 cwt. applied to the soil as a base dressing (18).

Of recent years great advances have been made in increasing the precision of field trials by the application of statistical methods, and these allow of considerable accuracy in studying both the simple effects of nutrients and their interactions (19).

No system of determining mineral nutrients should be considered to be complete without testing the results in field trials, whilst to obtain the maximum amount of information regarding mineral status from field tests they should be combined with the other methods described in this section.

METHODS OF CORRECTING UNSATISFACTORY NUTRIENT STATUS IN PLANTS

It will be clear from the preceding sections that unsatisfactory nutrient status in plants may be due to deficiencies, excesses or unfavourable ratios of nutrients, and there still remains for discussion the ways in which these conditions may be corrected.

Before considering the application of chemical treatments to such problems the general environment of the plants should be considered. For instance, are conditions of light, temperature, physical condition of the soil, soil moisture and drainage satisfactory? If not, these factors should receive the appropriate adjustment since each may be the cause of faulty mineral nutrition. Thus excessive light may intensify deficiencies of nitrogen or zinc, low soil temperatures or inadequate soil moisture may prevent the intake of mineral nutrients, and defective drainage may reduce materially the absorption of the major nutrients, particularly potassium, or increase the intake of manganese. But after such points have received attention there still remains the problem of increasing or decreasing the contents of the various mineral nutrients by chemical means.

The chief method of curing deficiencies is, of course, by the addition of manures, fertilizers and lime to the soil. And here I must say a word or two regarding the mineral-supplying powers of organic materials. It must be recognized that such materials have not equal values as sources of mineral nutrients, because of their different contents of minerals, their different adsorptive powers and their special properties of acidity and alkalinity. Thus ordinary farmyard manure is an excellent

source of potassium and phosphorus, but is less effective in supplying nitrogen. Its powers of furnishing other nutrient elements are less well known, but it should certainly not be regarded as a universal supplier of nutrients. I have, for example, seen vegetable marrows, acutely deficient in manganese, growing on heaps of stable manure.

Again, sewage sludge is sometimes advocated as equivalent to farm-yard manure, but field trials have shown the two materials to be different. Sewage sludge, particularly activated sludge, is undoubtedly a better source of nitrogen than dung, but is poorer in phosphorus and almost without value for potassium. A third organic material, peat, has vastly different qualities from either of the above, depending largely on its acid nature, whilst it may be pointed out that some of the most acutely deficient soils in various parts of the world, especially as regards trace elements, are peat soils, both acid and calcareous types. The conclusion we must reach from such facts is that we must not generalize too much regarding the properties of organic manures but must experiment with and test the particular values of these heterogeneous and variable materials.

The problems arising from the use of fertilizers are in some respects simpler than those of complex organic materials. We do know, for example, what nutrients they are intended to supply and we are often given some idea of the likely availability of these to plants. We do not, however, know their full composition and there may be other constituents in addition to those declared which are either unsuspectedly beneficial or harmful. One of the chief drawbacks to fertilizers is, of course, that they are far from being "complete nutrients," even though those containing nitrogen, phosphorus and potassium are often regarded as such and described as such.

Fertilizers, by the possibility of their precise description as regards their content of mineral nutrients, do offer a means of applying definite amounts of these to plants to correct deficiencies on a quantitative basis and I think, as knowledge is extended, we may hope to see great improvements in their value to the gardener.

One modern trend in fertilizer production requires special mention. With recent developments in farming practices there has been a tendency to introduce highly concentrated fertilizers and in doing so there is a risk that this may lead to the elimination of useful "impurities," including trace elements.

Whilst past experience has shown that fertilizers and manures applied to the soil can be relied upon effectively to supply the elements N, P and K, the question arises as to whether the lesser-known nutrients may also be supplied efficiently in this way. The main problems in this connexion relate to magnesium and the trace elements, and for these the position seems to be as follows :

Magnesium may be given as soil dressings either in the form of ground magnesian limestone or as magnesium sulphate, but often when the element is acutely deficient in horticultural crops the condition is associated with high potassium status and in such instances it has been found that soil dressings are not very effective and that foliage sprays are much more efficient.

As regards trace elements, iron has proved the most difficult defi-

ency to correct. Soil dressings of iron salts are generally useless whilst foliage sprays are usually too damaging and at best only provide temporary benefits. Solid injections for trees have proved effective for considerable periods—3 to 4 years—and are well worth while, but they are tedious and expensive of labour on a large scale. It may be noted that there is no satisfactory cure for iron deficiency for crops other than trees, which are suitable for solid injections, and all the horticulturist can do with other crops is to avoid calcareous soils conducive to the deficiency when he is planting susceptible plants. Iron deficiency is the only deficiency for which there is no satisfactory and easy remedy.

Manganese, zinc and copper deficiencies present rather similar problems of control, although the two latter may occur on acid soils on which soil dressings may be very effective. Frequently, however, results from soil applications are poor, due to low availability of the added salts, and the most effective cures are by means of foliage sprays and solid injections. It may be noted that the availability of these elements is often greatly decreased by high contents of lime and organic matter in the soil, which conditions are often important causes of the deficiencies. Sulphur is often effective in curing deficiencies caused by excess lime content, mainly by lowering the pH of the soil. Boron deficiency is easily corrected by soil dressings and may also be cured by foliage sprays and solid injections.

Molybdenum deficiency also responds readily to soil treatment and presents no practical difficulties. Availability of molybdenum is increased by liming.

The two excesses which arise naturally as the result of soil acidity, viz. manganese and aluminium, are remedied by removing the acidity by lime applications. Liming also will often reduce the toxic effects of other heavy metal compounds, such as zinc, copper, chromium, nickel and cobalt, though it does not provide a universal cure and indeed the treatment may only serve to create a deficiency of manganese as an added problem if the organic matter content of the soil is high.

Excesses of other elements, such as potassium, nitrogen and phosphorus, may usually be ameliorated by correcting the deficiencies induced by them by the usual method of application of the deficient element in question.

SPECIAL PROBLEMS OF TRACE ELEMENTS IN HORTICULTURAL CROPS

It will have been seen in these lectures that the special problems associated with trace elements in horticultural plants concern the special requirements of particular plants for them, the special soil conditions which are conducive to deficiencies and excesses, and the special methods which are required to cure or prevent injurious effects.

As regards the special requirements of horticultural plants for trace elements it can be said that trace elements are of great importance in the garden, as will have been evident from the numerous illustrations already given. Moreover, they are of importance for a very large range of horticultural plants, although there are certain groups of plants for which particular deficiencies are not very prevalent in practice, *e.g.* iron for vegetables, although this deficiency is often most troublesome on trees, shrubs and certain greenhouse plants.

Then in discussing soil conditions conducive to trace element deficiencies and excesses, the importance of pH and organic matter has been stressed, and under English conditions these factors are outstanding in relation to problems of manganese and iron. The importance of management factors must also be borne in mind in considering both deficiencies and excesses, and in connexion with the latter it must never be forgotten that the amounts of trace elements required by plants are much smaller than for the major elements and that overdoses are very toxic, *e.g.* a dressing of 20 to 40 lb. per acre of borax, which may be required for Cauliflower or Beet crops to correct a deficiency of boron, may prove toxic to Potatoes, a crop with a low boron requirement. And, lastly, it will have been seen that the curing of trace element troubles may call for special measures, such as foliage spraying and stem injections, to obtain quick and effective results, particularly for iron, manganese, zinc and copper.

SUMMARY

The supply of mineral nutrients comprises an important aspect of the general problem of the nutrition of plants, and a knowledge of the problems concerned in mineral nutrition will enable the horticulturist to understand many of his difficulties and to exercise a considerable measure of control over the growth, flowering and fruiting characters of his plants. Crops can be grown in a rooting medium such as sand or gravel without organic matter by the use of suitable mineral nutrients, though organic matter is essential for soil cultures to ensure favourable conditions of soil structure and water supply and to sustain the soil organisms. In soils, however, the soil organic matter and bulky organic dressings often fail to supply adequate amounts of available mineral nutrients for healthy growth, and it is frequently necessary to add certain of these as fertilizers to obtain satisfactory results.

The so-called "complete" fertilizers are only intended to supply guaranteed amounts of nitrogen, phosphorus and potassium and, though they all contain other plant nutrients as impurities, these may be insufficient to meet the requirements of crops.

Twelve mineral elements have so far been proved to be essential for the growth of plants, six being required in relatively large amounts (major elements) and six in smaller amounts (minor or trace elements). This list may well be incomplete though any other elements to be added must only be required in very small quantities. In addition, some other elements have been shown to produce beneficial effects on particular plants. All the essential elements have been shown to be of importance in practice.

The main practical problems of mineral nutrients are concerned with deficiencies and excesses of the individual elements and with relationships between certain of them. The effects produced by a deficiency or excess of any of the elements are often well defined and characteristic, and can be used in the diagnosis of the mineral status of plants.

In addition to the mineral elements directly concerned with plant nutrition other elements may enter into nutritional problems in the field by producing toxic effects, which may partly take the form of inducing deficiencies of essential nutrients, particularly of iron.

The conditions under which deficiencies, excesses and unfavourable ratios occur may arise directly from the nature of the soil or from climatic factors, cropping systems and practices, and the special requirements of particular crops. With regard to soil conditions, the nature of the parent rock, soil texture, drainage, organic matter content and pH are of special importance as they profoundly influence both the total and available supplies of the various nutrients. pH and organic matter are especially important in determining the availability of trace elements.

Acid conditions in soils result in complicated problems of mineral nutrition, the main features of which are deficiencies of the basic elements, calcium, magnesium and potassium, and often of nitrogen and phosphorus, and of toxic concentrations of manganese and aluminium and of hydrogen ions.

Plants which are susceptible to soil acidity differ in their resistance to these adverse factors.

The importance of the individual nutrients varies for different crops and this fact must be recognized in practice. Such differences may also largely decide the grouping of plants as calcicoles and calcifuges, where the problems may concern both deficiencies and excesses of particular nutrients.

Several methods involving plants and soils have been devised to determine the mineral status of plants. None of these used alone can be relied upon to provide a correct picture in all circumstances, but by using various combinations of the methods even the most difficult problems can be solved.

A number of methods are necessary to correct efficiently unsatisfactory mineral status in plants. The time honoured methods of applying manures and fertilizers to the soil are not always effective, and for certain of the trace elements, especially iron and manganese and sometimes copper and zinc, the elements must be applied by other means, particularly by foliage sprays or by direct injection of solids into the plants. Soil "placement" methods are also of importance.

The trace elements present special problems in practice in connexion with the special requirements of particular plants for them, the special soil conditions which are conducive to deficiencies and excesses, and the special methods needed to correct deficiencies and to prevent injurious effects from excesses.

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NEW AND NOTEWORTHY PLANTS

A New Rhododendron, R. Aberconwayi

THE *Rhododendron* which is the subject of the accompanying plate—(Fig. 154) *Rhododendron Aberconwayi* Cowan—is new to science and to cultivation. It is suggested that it may best be placed in the *Irroratum* Series—it can go into no other—but it falls easily into no constituted series.*

Though it has many of the characteristics of *R. irroratum* Franch. yet the open, flatly campanulate or almost saucer-shaped corolla marks it as distinct from all other species of the series save *R. Hardingii* G. Forrest. Moreover, the inflorescence is very definitely racemose. From *R. Hardingii*, and indeed from all other *Rhododendrons*, *R. Aberconwayi* can readily be distinguished by its leaves, which are of an unusually rigid, leathery texture, with the margin markedly recurved; but even more remarkable is the brittle texture of the lamina—when slightly bent it immediately cracks and breaks.

As a species yet without a name, *R. Aberconwayi* was awarded first prize in its class when exhibited by MR. J. B. STEVENSON, under No. McL. T.41, at the Royal Horticultural Society's *Rhododendron* Show in May 1948; and it is fitting that a plant of high distinction should bear the name of the Society's distinguished President.

R. Aberconwayi is a native of Eastern Yunnan—the exact locality we do not know—but judging from the herbarium material it would appear to be not uncommon in the locality or localities where it is found.

* A full technical description of this new species has been published in the *R.H.S. Rhododendron Year Book 1948*.

After the death of GEORGE FORREST, near Tengyueh in January 1932, a number of the native collectors whom he had trained were employed by LORD ABERCONWAY to continue the search for new and unknown plants and to gather seed. *R. Aberconwayi* is one of the new species which they found. The field notes are inevitably brief and incomplete but seed was sent home in 1937 and numerous seedlings were raised. Plants of flowering size may be seen in various gardens—at Bodnant, at Tower Court, Ascot, and at the Royal Botanic Garden, Edinburgh.

J. MACQUEEN COWAN

FROST DAMAGE SURVEY, 1946-47

PART II

ABBREVIATIONS

K = Killed
G = Cut to ground level
B = Badly injured
S = Slightly injured
U = Uninjured
• = Recent introduction

† = Growing on or planted near to wall
Letters *N. S. E. W.* in italics after wall sign indicate exposure on wall: North, South, East and West
Numerals indicate number of years planted. They are placed after the garden to which they refer.

- Magnolia Campbellii*. K. Leith Vale, 14. S. Salcombe, 45. U. Bodnant, 44. R.B.G.E., 30, Kew, Stranraer.
Delavayi. K. R.B.G.E. G. Burghclere, 13. B. Henfield, 14. S. Bodnant, 46, Kew, Royston, 9.
globosa. B. Kew. U. Bodnant, 12, R.B.G.E., Northampton, 12, *grandiflora*. K. Leith Vale. K. & B. Lamberhurst, † 100. B. Chiddingfold, 50, Hitchin, 10, Oxford, † S., Spelsbury, 50. S. Bodnant, 70, Burghclere, 10, Claverley, Kew, † 60, Marlborough, Osmington. U. R.B.G.E., Wormley Bury, † E 70.
grandiflora ferruginea. B. & S. Burghclere, 10. S. Salcombe, 40, Westonbirt, †. U. R.B.G.E.
liliflora nigra (*Soulangeana nigra*). S. Birstwith, Leith Vale. U. Burghclere, 10, R.B.G.E., Kew.
macrophylla. B. Taynult, 4. S. Bodnant, Burghclere, 8, Kew. Z. R.B.G.E.
obovata. B. Horsham, 30, Wisley. S. Kew. U. Bodnant, 40, Burghclere, 12, R.B.G.E., Leith Vale.
rostrata. B. Westonbirt.
salicifolia. S. Edinburgh. U. Bodnant, R.B.G.E., † 10, Kew, Westonbirt, Wormley Bury.
Sargentiana. U. Westonbirt.
Sieboldii (*parviflora*). G. Chiddingfold. B. Leith Vale. S. Westonbirt. U. Burghclere, 12, R.B.G.E., † 10, Glencarse, 20, Kew, Wormley Bury.
**sinensis*. G. Dorchester. S. Kew. U. Bodnant, R.B.G.E., Glencarse, Goring-by-Sea, Northampton, 10.
stellata. B. Forres. S. Oxford, Watlington, 40. U. Bodnant, 44, Burghclere, 13, R.B.G.E., † 10, Edinburgh, Helsby, 25, Kew, Westonbirt.

- Magnolia Watsoni*. K. Finchampstead, 5. U. Bodnant, 32, Burghclere, 12, R.B.G.E., † 10, Helsby, 12, Kew, Westonbirt.
denudata, *Kobus borealis*, *Soulangeana* all vars., *Veitchii Wilsoni*. U. all areas recorded including Bodnant, Burghclere, Edinburgh, R.B.G.E., Glencarse, Goring-by-Sea, Kew, Leith Vale, Oxford, Westonbirt, Wormley Bury.
- Mahonia Bealii*. B. Crathes, injured above snow line, Kew. S. Leith Vale. U. Burghclere, 12, Goring-by-Sea, Wormley Bury, 25. Z. R.B.G.E.
- haematocarpa*. U. Crathes covered by snow, Kew. Z. R.B.G.E.
- japonica*. B. Burghclere, 10, Kew. U. Edinburgh, 9, Goring-by-Sea.
- **Iomariifolia*. K. Leith Vale, Thorpe-le-Soken, 10. G. Benenden, Burghclere, Goudhurst, 4, Northampton, 13. Wormley Bury, 10. B. Bridgnorth, R.B.G.E., 8. S. Goring-by-Sea, West Porlock, 2, Wisley.
- nepaulensis*. B. R.B.G.E. S. Kew, Leith Vale, West Porlock, 10.
- Mandevilla suaveolens*. K. Dunster, † S. B. Sidmouth, 9. S. Kew, †. Z. R.B.G.E.
- Maytenus Boaria*. U. Crathes. Z. R.B.G.E.
- Melaleuca hypericifolia*. K. Dunster, † W. Z. R.B.G.E.
 sp. B. Brodick, † S. 12. S. Isles of Scilly. Z. R.B.G.E.
- Metrosideros diffusa*. G. Isles of Scilly, 40. Z. R.B.G.E.
- robusta*. S. Rhu, 8. Z. R.B.G.E.
- tomentosa*. B. & S. Isles of Scilly, 100. Z. R.B.G.E.
- villosa*. G. Isles of Scilly. Z. R.B.G.E.
- Mimulus aurantiacus*. K. Oxford, Kew. G. Bodnant. Z. R.B.G.E.
- Montbretia* 'His Majesty.' G. Chard, 7. U. R.B.G.E.
- Moraea Robinsoniana*. K. Kew. B. Isles of Scilly, 100. Z. R.B.G.E.
- Morus* (Mulberry). K. Farnham, Hitchin, 2. U. R.B.G.E., † 30, Kew.
- Musa Basjoo*. K. Kew. G. Isles of Scilly, 40, Wisley.
- Mutisia ohgodon*. U. Bodnant, Crathes, † S. 4, R.B.G.E.
- retusa*. K. Sutton Scotney, 6. S. Burghclere, 5. U. Isles of Scilly, Wormley Bury, † S. 12. Z. R.B.G.E.
- Myrica Faya*. S. Isles of Scilly.
- Myrtus bullata*. K. Burghclere, 5, Kew. U. Isles of Scilly. Z. R.B.G.E.
- communis*. K. Deal. G. Chiddingfold, Great Amwell, † 20, Godalming, 12, Horsham, † S., Minehead, Nutley, Thorpe-le-Soken, Whitchurch, 26. G. & B. Benenden, West Porlock, 30. B. Kew, Teignmouth, 20, Wormley Bury, † E, 80. U. Isles of Scilly. Z. R.B.G.E.
- communis tarentina*. G. Wisley.
- Lechleriana*. K. R.B.G.E. B. Bodnant, severely damaged on all walls. U. Isles of Scilly.
- obcordata*. B. Burghclere, Menai Bridge, 15, West Porlock, 12. U. Isles of Scilly. Z. R.B.G.E.
- Ralphii*. K. Burghclere, 5. U. Isles of Scilly, Kew. Z. R.B.G.E.
- Ugni*. K. Osmington, 12. G. Deal, 10. B. Burghclere, 6, Kew. U. Isles of Scilly. Z. R.B.G.E.
- Nandina domestica*. K. Kew. B. Northampton, † 45. S. Burghclere, 9, Leith Vale, Sevenoaks, Wisley. U. Bodnant, Isles of Scilly. Z. R.B.G.E.
- Nepeta Mussini*. K. Bodnant, 50 per cent. killed outright. K. & B. Burghclere. B. Leith Vale. S. Kew. Z. R.B.G.E.

- Nerine Bowdeni* and hybrids. U. all areas recorded including, Bodnant, Deal, R.B.G.E., Goring-by-Sea, Kew, Leith Vale.
- Nerium Oleander*. K. Dunster, † W., Kew. U. Isles of Scilly. Z. R.B.G.E.
- Nothofagus antarctica*. B. & G. Leith Vale, 20. U. Westonbirt.
- Cunninghamii*. K. Burghclere, 12, Kew, Westonbirt. B. Londonderry, 25. U. Isles of Scilly. Z. R.B.G.E.
- Dombeyi*. G. Westonbirt (second time). B. Henfield, 14. S. Burghclere, 14. U. Bodnant, R.B.G.E., 6, Kew.
- fusca*. K. Kew. K. & B. Chard, 6. B. Burghclere, Horsham. S. Londonderry. U. R.B.G.E., 10, Isles of Scilly.
- Menziesii*. K. Kew, Westonbirt. B. Benenden, Burghclere, R.B.G.E., Horsham, Isles of Scilly.
- obliqua*. U. Westonbirt, Wormley Bury.
- procera*. S. Westonbirt.
- Solandri*. K. Burghclere, 12, Horsham, Kew, Westonbirt. U. Isles of Scilly. Z. R.B.G.E.
- Nothopanax* sp. K. Osmington, 12. U. Isles of Scilly. Z. R.B.G.E.
- Nyssa sylvatica*. B. Taynult, 6. S. Leith Vale. U. Burghclere, 12, R.B.G.E., 6, Kew, Westonbirt, Wormley Bury 15.
- Olearia* sp. None killed or injured, Isles of Scilly.
- Olearia avicenniæfolia*. K. Dorchester, 20, Goring-by-Sea. B. Kew, Nutley, 25. Z. R.B.G.E.
- Haastii*. K. Birstwith, Rednal, 40, Whitchurch, 7, Westonbirt, one position, S. in another position. G. Basingstoke, Oxford, 2, Up-lawmoor, 15. B. West Corbet Place, Basingstoke, Christchurch, Claverley, Nutley, 14, Wisley. S. Kew. U. R.B.G.E., † 10, Goring-by-Sea.
- ilicifolia*. K. Binfield, 9, Oxford. S. Kew. Z. R.B.G.E.
- insignis*. K. Kew, Leith Vale, Goring-by-Sea. B. Henfield. Z. R.B.G.E.
- macrodonata*. K. Dorchester, 20, Goudhurst, 6, Henfield, 5, Leith Vale. K. & G. Hawkhurst. G. Nutley, 20. B. R.B.G.E., † 20, Handcross, Wisley. S. Birstwith, 20, Kew. B. & S. Cuckfield.
- nummulariifolia*. K. Birstwith, 14, Oxford. S. Kew, Leith Vale, Wisley. U. R.B.G.E., 8.
- paniculata* (*Forsteri*). K. Osmington, 12, Teignmouth, 15. B. Kew. Z. R.B.G.E.
- semidentata*. K. Bodnant on covered wall, Goring-by-Sea, Kew. Z. R.B.G.E.
- stellulata* (*Gunniana*). K. Oxford, 2, Stonegate, 6. G. Handcross, † 15. B. R.B.G.E.
- stellulata*, pink forms. K. Wisley.
- virgata lineata*. G. Wisley. U. R.B.G.E., 10, Helsby, 20.
- Osmanthus Delavayi*. B. Wormley Bury, 20. S. Bridgnorth, 7, Campden, Goring-by-Sea, Kew, Leith Vale, Oxford, Salcombe, 25. U. Bodnant, 25, Burghclere, 12, R.B.G.E., 20, Isles of Scilly.
- suavis*. U. Wormley Bury, † W, 12.
- **Osmarea Burkwoodii*. S. Crathes, 10, Oxford. U. R.B.G.E., 15, Kew, Westonbirt.
- Osteomeles Schwerinae*. B. Wisley. U. Westonbirt, †.
- Oxyptalum coeruleum*. S. Hawkhurst, 1. Z. R.B.G.E.

- Paeonia suffruticosa* (Moutan). S. Kew. U. Albrighton 10, R.B.G.E., Goring-by-Sea, Leith Vale.
- Passiflora coerulea*. K. Kew, Midhurst, † S. 6, Wormley Bury, † S. 10. G. Oxford, † S. 2. S. Hawkhurst, † S. 3. U. Isles of Scilly. Z. R.B.G.E.
- Paulownia tomentosa* (imperialis). K. Taynult, 6. G. Burghclere, 6. B. Leith Vale. S. Kew. U. Bodnant, Deal, 25, R.B.G.E., 6, Goring-by-Sea.
- Pelargonium* sp. (Sweet Scented). G. & S. Isles of Scilly. Z. R.B.G.E. sp. (Zonal). K. & G. Isles of Scilly. Z. R.B.G.E.
- Penstemon cordifolius*. K. Burghclere, 8, Kew, Oxford, 2. B. Bodnant (on covered wall). Z. R.B.G.E.
- isophyllus*. B. R.B.G.E., S. Oxford, 1. U. Chard.
- Pernettya mucronata*. K. Leith Vale, Wormley Bury, 20. G. Bodnant. B. Ambleside, Claverley, Dalbeattie, 30, R.B.G.E., † 10. S. Burghclere, 12, Wisley. U. Isles of Scilly, Kew.
- Perowskia atriplicifolia*. G. Goring-by-Sea. B. Great Amwell, 15, Oxford, 2. S. Bodnant. U. R.B.G.E., Wisley, Wormley Bury, 15.
- Schrophulariaefolia*. S. Wisley, † S.
- Persea indica*. G. Benenden. Z. R.B.G.E.
- Philesia magellanica* (buxifolia). S. R.B.G.E., † 10. U. Bodnant, Burghclere, 9.
- Phillyrea angustifolia*. B. Binfield. S. Leith Vale. U. R.B.G.E., Goring-by-Sea, Kew.
- Phlomis* sp. K. & B. Deal, 15. B. Dunchidcock, 10, Kew. U. Isles of Scilly.
- fruticosa*. G. Oxford. S. Wormley Bury, 20. U. R.B.G.E.
- Phormium tenax*. K. Leith Vale, Oxford. K. & B. Salcombe, 10-30. K. & S. Wormley Bury, 6. G. Goring-by-Sea, Wisley. B. Kew. U. Helsby, 10, Isles of Scilly, R.B.G.E.
- Photinia glomerata*. S. Bodnant, Kew. Z. R.B.G.E.
- serrulata*. G. Teignmouth, 10. S. Kew, Wisley. U. Isles of Scilly. Z. R.B.G.E.
- Phygелиus capensis*. G. Deal, Goring-by-Sea, Oxford, Teignmouth, 10. S. Kew, †. U. R.B.G.E., † 10, Isles of Scilly.
- Phyllocladus alpina*. U. Crathes, 15. Z. R.B.G.E.
- rhomboidalis*. U. Crathes, 6. Z. R.B.G.E.
- Phyllostachys aureus*. G. Leith Vale.
- Castilloni*. G. Leith Vale.
- viridi-glaucescens*. G. Chiddingfold, 40, Claverley, 12. B. Kew. U. Isles of Scilly. Z. R.B.G.E.
- Picea morrisonicola*. U. Londonerry, Kew. Z. R.B.G.E.
- asperata*, *brachytyla*, *Breweriana*, *glauca* var. *conica*, *Koyamai*, *likiangensis*, *purpurea*. U. All areas recorded including R.B.G.E., Kew, Leith Vale, Londonderry.
- Pieris floribunda*. Wormley Bury, 20.
- formosa*. B. Henfield, 10. S. Bodnant, R.B.G.E., † 10. U. Kew, Rhu.
- Forrestii*. K. Leith Vale. B. Benenden, Kew. B. & S. Burghclere, 12. S. Wisley. U. Bodnant, 15, Glencarse, 14. Z. R.B.G.E.
- japonica*. S. Leith Vale, Rednal, Rogate, 12. U. R.B.G.E., † 20. Kew. Wormley Bury, 12.
- taiwanensis*. S. Burghclere, 12, Leith Vale. S. R.B.G.E., Glencarse, 10, Helsby, Kew, Leith Vale.

- Pinus Montezumae*. K. Taynult, 5. S. Kew. U. Bodnant, 45. Z. R.B.G.E.
patula. S. Cuckfield, Kew, Thorpe-le-Soken. U. Bodnant. Z. R.B.G.E.
radiata (insignis). K. Chiddingfold, Leith Vale. B. Dunchidcock, 150. S. Kew. U. Bodnant, R.B.G.E.
yunnanensis. S. Cuckfield. Z. R.B.G.E.
Piptanthus bombycinus. B. Burghclere, 13. Z. R.B.G.E.
nepalensis. K. Leith Vale. S. Wisley. U. Connel, R.B.G.E., Kew, †, Wormley Bury, 25.
Pittosporum bicolor. K. Burghclere, 10. B. Kew. U. Isles of Scilly. Z. R.B.G.E.
eugenioides. K. Leighton Buzzard, 8, Salcombe, 35. B. Kew. U. Isles of Scilly. Z. R.B.G.E.
Mayi. K. Leith Vale. B. Kew, Londonderry, 8. Z. R.B.G.E.
tenuifolium. G. Burghclere, 10. B. Nutley, 20, Salcombe, 30. S. Goring-by-Sea. Z. R.B.G.E.
Tobira. K. Deal, Dunchidcock, Dunster, Goring-by-Sea, Marlborough, West Porlock, 30, Wormley Bury, † W. 12. B. Kew. U. Isles of Scilly. Z. R.B.G.E.
sp. K. Guildford, 2, Minehead, †; B. Brodick, 8, Osmington, 20, Teignmouth, 20. U. Isles of Scilly.
Platanus acerifolia. G. Taynult, 6. U. R.B.G.E., Kew.
Podalyria calyptrata. B. Isles of Scilly, 50, seedlings under snow killed. Z. R.B.G.E.
Podocarpus andina (Prumnopitys elegans). K. Oxford.
macrophylla. K. Cuckfield. Z. R.B.G.E.
saligna (chilina). B. Burghclere, 15, Londonderry, 8. U. Isles of Scilly. Z. R.B.G.E.
Totara. B. Cuckfield, 15. U. R.B.G.E., 7, Goring-by-Sea, Isles of Scilly.
Pomaderris elliptica. K. Kew. U. Crathes, † S. covered by snow. Z. R.B.G.E.
Populus koreana. U. Wormley Bury, 20.
Wilsonii. S. Cuckfield, 10. U. R.B.G.E., 20. Wormley Bury, 15.
Prostanthera lasianthos. K. Kew, West Porlock, 5. U. Brodick, killed 1916-17. Z. R.B.G.E.
retusa. K. Kew, Sutton Scotney, 2. Z. R.B.G.E.
rotundifolia. K. Ardmaddy, 2, Bodnant, †, Kew. Z. R.B.G.E.
Prunus campanulata. B. Kew. S. Burghclere, 10. U. R.B.G.E., 15, Goring-by-Sea.
cerasifera atropurpurea (Pisartii). K. Campden. U. R.B.G.E., Leith Vale. Wormley Bury, 15.
glandulosa sinensis. S. Binfield, 3. U. R.B.G.E.
Laurocerasus. K. Rednal, 20, Sutton Scotney. G. Stonegate. B. Forfar, Glencarse, Markyate, Uplawmoor. S. Kew, Leith Vale, Thorpe-le-Soken. U. R.B.G.E.
Pseudopanax crassifolium. U. Isles of Scilly.
ferox. U. Isles of Scilly, Kew, Salcombe. Z. R.B.G.E.
Punica Granatum. G. Chard, 6, Oxford, † S., Wisley. B. Chiddingfold, Kew, Pulborough, 12. U. Deal, 15, Goring-by-Sea, Minehead. Wormley Bury, † S. 15. Z. R.B.G.E.
Pyracantha atalantioides (Gibbsii). B. Hitchin, 16. S. Leith Vale, Wisley. U. R.B.G.E., Goring-by-Sea, Kew.
crenulata var. *Rogersiana*. B. Wisley.
sps. G. Bridgnorth, 7, Ludlow. B. Bicester, 6. U. R.B.G.E.

- Quercus lacera*. K. Cuckfield, 20. U. Kew. Z. R.B.G.E.
fruticosa (humilis). S. Cuckfield, 20. U. Kew. Z. R.B.G.E.
Ilex. B. Claverley, 10. S. Hitchin, old tree. U. R.B.G.E., Kew.
pachyphylla. K. Cuckfield, 8. U. Kew. Z. R.B.G.E.
Suber. B. Tewkesbury, 150. S. Kew, Londonderry, 8. U. Leith Vale, 20. Z. R.B.G.E.
- Raphiolepis Delacourii*. B. Burghclere, 10. S. Wisley. U. R.B.G.E., 9, Isles of Scilly, Kew.
indica. K. Burghclere, 10. U. R.B.G.E., 9, Isles of Scilly, Kew.
Rhaphitamnus cyanocarpus. B. Kew. S. Salcombe, 15. U. Isles of Scilly. Z. R.B.G.E.
Rhododendron agapetum. B. Kew. U. Rhu. Z. R.B.G.E.
arboreum. B. Nutley, 20, Rhu, 100. S. Bodnant, Dunchidcock, 150, Kew, Wisley. U. R.B.G.E.
arizelum. B. Kew. U. R.B.G.E., † 20, Glencarse, 24.
Augustinii. S. Wisley.
aureum. K. Wisley.
barbatum. K. Leith Vale. K. & B. Chiddingfold. U. R.B.G.E., † 30, Kew.
 'Beauty of Tremough.' K. & B. Chiddingfold. Z. R.B.G.E.
bullatum. K. R.B.G.E., Leith Vale. B. Kew. G. Henfield; U. Rhu.
callianthum. S. Kew, U. Helsby, Z. R.B.G.E.
callimorphum. S. Kew, Leith Vale. U. R.B.G.E., Helsby.
campylocarpum. K. & B. Chiddingfold. S. Kew. U. Birstwith, R.B.G.E.
chasmanthum. S. Wisley.
chryseum. S. Kew. U. R.B.G.E., Helsby.
 'Cornish Cross.' K. & B. Chiddingfold. S. Kew. U. R.B.G.E.
 'Countess of Haddington.' S. Brodick, 9, Kew, Rhu. Z. R.B.G.E.
crassum. S. Kew, U. Rhu. Z. R.B.G.E.
croceum. S. Leith Vale. U. R.B.G.E., Helsby.
Davidsonianum. B. Wisley. U. R.B.G.E., Helsby, Kew.
decorum. S. Leith Vale. U. Blane-field, R.B.G.E., Kew.
Delavayi. B. Cuckfield. S. Kew. U. Brodick, 20, Helsby. Z. R.B.G.E.
eriogynum. S. Kew. U. Rhu. Z. R.B.G.E.
 'Essex Scarlet.' S. Ardmaddy. U. Kew. Z. R.B.G.E.
euchaites. B. Wisley.
facetum. S. Kew. U. Rhu. Z. R.B.G.E.
Falconeri. B. Pulborough, 8. S. Kew. U. R.B.G.E., Glencarse, 30.
 'Fragrantissimum.' S. Kew. U. Helsby, West Porlock. Z. R.B.G.E.
grande. K. Finchampstead, 5. S. R.B.G.E., Kew.
Griersonianum. K. Finchampstead, Hawkhurst. B. Benenden, Wisley, Leith Vale. B. & S. Burghclere, Glencarse. S. R.B.G.E., Kew. S. & U. Bodnant.
Griffithianum. K. Finchampstead, 9, Kew. B. Londonderry, 15. S. Rhu. Z. R.B.G.E.
hirsutum. K. Brodick, 15. U. R.B.G.E., Kew.
Hookeri. K. Wisley. S. Kew. U. Rhu. Z. R.B.G.E.
insigne. U. Helsby, Kew. Z. R.B.G.E.

- Rhododendron irroratum.* B. Wisley.
Kyawi; U. Kew, Rhu. Z. R.B.G.E.
 'Lady Alice Fitzwilliam.' S. Ardmaddy. U. West Porlock. Z. R.B.G.E.
 'Lady Chamberlain.' B. Wisley. S. Leith Vale. U. Glencarse, 7, Kew. Z. R.B.G.E.
laxiflorum. S. Cuckfield, R.B.G.E. U. Kew.
Lindleyi. K. Kew. U. Rhu. Z. R.B.G.E.
 'Loderi.' K. & B. Chiddingfold. U. Blanefield, R.B.G.E., Kew.
Maddenii. U. Brodick 8-20, Rhu. Z. R.B.G.E.
manipurensis. S. Wisley. U. Rhu. Z. R.B.G.E.
megacalyx. U. Ardmaddy, Rhu. Z. R.B.G.E.
mezerium. B. Wisley.
Nuttallii. K. Brodick, 1. U. Isles of Scilly. Z. R.B.G.E.
 'Penjerrick.' B. Chiddingfold, S. Wisley. Z. R.B.G.E.
ponticum. G. Blanefield, Taynult. B. Ambleside, Dalbeattie, 30, Forres, Kirkcowan, Lamington, 10, Musselburgh. U. R.B.G.E.
 'Praecox.' K. Sevenoaks, 14. B. Leith Vale. S. Rednal, 20. U. R.B.G.E.
repens. B. Leith Vale. U. Brodick, 8-20, R.B.G.E., Helsby, Henfield, 12.
rhabdotum. B. Ardmaddy, 2, Benenden. S. Rhu. Z. R.B.G.E.
saluenensis. K. & B. Chiddingfold. U. R.B.G.E., Helsby.
sperabile. S. Wisley, U. Helsby, 15, R.B.G.E.
 **Taggianum.* K. Kew. U. Brodick. Z. R.B.G.E.
 'Tally Ho.' B. Leith Vale, Chiddingfold. S. Burghclere, Kew. R.B.G.E.
tanastylum; B. Cuckfield. U. Kew. Z. R.B.G.E.
tephropeplum. B. R.B.G.E., S. Kew, Wisley. U. Helsby.
Williamsianum. B. Leith Vale. U. Birstwith, R.B.G.E., Kew.
brevistylum, caloxanthum, 'Cilpinense,' calostrotum, cephalanthum, chaetomallum, charitopes, diaprepes, 'Emasculum,' ferrugineum, fichtolactum, floccigerum, fulgens, hippophaeoides, hemitrichotum, ledoides, 'Loder's White,' oreotrephe, ravum, russatum, sanguineum, scintillans, scyphocalyx, sinogrande, Stewartianum, Thomsonii, vernicosum, yunnanense. U. all areas recorded including, Glencarse, Helsby, R.B.G.E., Kew.
Rhodohypoxis Baurii. S. Albrighton, 2, Kew. U. R.B.G.E.
Rhus glabra laciniata. K. Helsby, 14. Z. R.B.G.E.
typhina. B. Dalbeattie. U. R.B.G.E., Goring-by-Sea, Kew.
Ribes speciosum. K. Leith Vale. S. Campden. U. R.B.G.E., Goring-by-Sea, Kew †.
Richardia africana. B. Isles of Scilly. Z. R.B.G.E.
Robinia Pseudoacacia Decaisneana. S. Taynult, 6. U. R.B.G.E., † 30, Kew.
Romneya Coulteri. K. Beaconsfield, 10, Oxford, Warwick. B. Goring-by-Sea. S. Leith Vale. U. R.B.G.E., Kew. Wormley Bury, 15.
Rosa 'Alberic Barbier.' B. Watlington, 12. U. R.B.G.E., † 20, Kew.
anemoneflora. B. Oxford.
Banksiae. K. Handcross, Horsham, † W. 80, Wormley Bury, 10. G. Lamberhurst, † S. B. Oxford, † S. S. Kew. U. Goring-by-Sea, Isles of Scilly. Z. R.B.G.E.
bracteata. K. Burghclere, 7, Wormley Bury, † S., 12 (since quite recovered). S. Goring-by-Sea. Z. R.B.G.E.

- Rosa Cooperi.* G. West Porlock, 8. Z. R.B.G.E.
 'Fellenberg.' B. Watlington, 26. U. R.B.G.E.
 'Gloire de Dijon.' G. Hitchin, 9. U. Isles of Scilly. Z. R.B.G.E.
 'La Follette.' K. Burghclere, † (low) W. 8, Cuckfield, † S. 8. S. Goring-by-Sea, Kew. U. Wormley Bury, † S. 12. Z. R.B.G.E.
 'Lady Hillingdon' climbing. G. Abingdon, 16. U. Isles of Scilly. Z. R.B.G.E.
laevigata. S. Kew. U. Bridgnorth, 8. Z. R.B.G.E.
longicuspis (sinowilsonii). B. Deal, 15, Wormley Bury, 15. S. Kew, †. U. Bodnant, R.B.G.E., Goring-by-Sea.
 'Macartney.' G. Wormley Bury, † S. 12 (since recovered). B. Marlborough, 10. S. Chard, † 18, Kew. Z. R.B.G.E.
 'Mermaid.' K. Bicester, 6, Burghclere, † S.E. 12, Leith Vale, 18, Oxford, 10, Watlington (on House Wall), 8, Woking, 23. K. & G. Hitchin, 9. K. & B. Dorchester. G. Dunchidcock. S. Goring-by-Sea, Kew, Wisley, † W. U. R.B.G.E., Isles of Scilly, * Wormley Bury, † S. 3.
 'Paul's Scarlet' climber. K. High Wycombe, 4. U. R.B.G.E., Wormley Bury, † S. 12.
 'Ramona.' G. Burghclere, 7, Oxford, † S. 1. B. Wormley Bury, † S. (since dead). S. Kew. U. Goring-by-Sea. Z. R.B.G.E.
- Rosmarinus officinalis.* K. Hitchin, 8, Hurst, 10, Kirkcowan, 30, Leith Vale, Pulborough, Rednal, 10, Stratford-on-Avon, 12, Sutton Scotney, 5. K. & B. Osminston. B. Sissinghurst, 14, Watlington, Wisley. S. Deal, Kew. U. R.B.G.E., Goring-by-Sea, Isles of Scilly. Wormley Bury, 15.
- Salvia Bethelli.* K. Great Amwell, Wormley Bury. G. Oxford. U. Isles of Scilly. Z. R.B.G.E.
Grahamii. K. Bodnant, Musselburgh, 15, Oxford. S. Kew, †. U. Isles of Scilly. Z. R.B.G.E.
neurepia. G. Oxford.
rutilans. K. & G. Minehead. S. Kew, †. U. Isles of Scilly. Z. R.B.G.E.
uliginosa. K. Chard, 10, Goring-by-Sea, Oxford, Wisley. U. Isles of Scilly. Z. R.B.G.E.
- Santolina Chamaecyparissus (incana).* K. Claverley, 3. B. Wisley. U. R.B.G.E.
- Sapium japonicum.* U. Crathes, † E. covered by snow. Z. R.B.G.E.
Sarcococca rusciifolia. K. Nutley, 20. G. Oxford, 2. S. Wormley Bury, 10. U. R.B.G.E., Kew.
- Sassafras albidum (officinalis).* B. Glencarse, 20. U. Kew. Z. R.B.G.E.
Saxegothaea conspicua. K. How Mill. U. R.B.G.E., Kew.
Sciadopitys verticillata. K. Oxford, 5.
Seasforthia elegans. B. Isles of Scilly, 60. Z. R.B.G.E.
- Senecio Greyi.* K. Snowhill, Whitchurch, 6, Uplawmoor, 3. K. & G. Deal, Hitchin. G. Binfield, Godalming, Leith Vale, Oxford. G. & S. Burghclere, 12. B. Dunchidcock, 15, Kew, Stonegate, 10, Watlington, 4. U. R.B.G.E., Goring-by-Sea.
incanus. K. Bicester, 5, R.B.G.E.
laxifolius. K. Wisley.
Monroi. K. Bridgnorth, 7, Wisley. B. Kew. S. Isles of Scilly. U. R.B.G.E., Goring-by-Sea.
species—none killed, Isles of Scilly.

- Sequoia sempervirens*. B. Chiddingfold. S. Dunchidcock. U. R.B.G.E., Kew.
- **Sinojackia Rehderiana*. S. Crathes, 3. U. Kew. Z. R.B.G.E.
- Solanum crispum*. K. Oxford, 20, Salisbury, 20. G. Sissinghurst, 12. S. Bodnant, Kew, †, Pulborough. U. Goring-by-Sea. Z. R.B.G.E.
- Solanum jasminoides*. K. Chiddingfold, †. G. Bodnant, Bridgnorth, †, Chard, †. G. & B. Londonderry, 15. B. Minehead. S. Bodnant, Kew, †. U. Isles of Scilly. Z. R.B.G.E.
- valdiviense*. G. Oxford, 2.
- Sophora tetraptera grandiflora*. K. Burghclere, † S. 9, Osmington, 10, Richmond (Yorks.), † S.W. 25, Thorpe-le-Soken. B. Cuckfield, Kew, Musselburgh, Oxford, 3. U. Isles of Scilly. Z. R.B.G.E.
- tetraptera* var. *microphylla*. U. Bodnant, R.B.G.E., Isles of Scilly, Kew.
- Sparaxis* sp. K. Chard, 17. U. Isles of Scilly. Z. R.B.G.E.
- Sparmannia africana*. K. Kew, Ludlow, stood 29° of frost in 1931 in Shrubbery. G. Isles of Scilly 100. Z. R.B.G.E.
- Spartium junceum*. K. Leith Vale. K. & G. Farnham. K. & S. R.B.G.E. G. Dalbeattie, 6. B. Briantspuddle, 18, Kew, Oxford, Sutton Scotney, Wisley. S. Birstwith. U. Isles of Scilly, Goring-by-Sea, Wormley Bury, 15.
- Spiraea tomentosa* (Lindleyana). B. Leith Vale, Rednal, 20. S. Oxford. U. R.B.G.E., Isles of Scilly, Kew.
- Thunbergii*. G. Campden. U. R.B.G.E., Kew.
- Stephanandra* sp. K. Binfield, 5. U. R.B.G.E., Kew.
- Stranvaesia Davidiana undulata*. B. Campden, Leith Vale, Wisley. U. Wormley Bury, 15-20.
- **Styrax Fargesii*. K. R.B.G.E. U. Crathes, 3, Kew, Wormley Bury, 15.
- Wilsonii*. K. Burghclere, 9. S. Kew. U. R.B.G.E., Wormley Bury, † E. 15.
- Syringa persica*. K. Oxford.
- Taiwania cryptomerioides*. G. R.B.G.E. B. & G. Cuckfield. U. Isles of Scilly.
- Tamarix pentandra*. U. R.B.G.E., Kew, Uplawmoor, 5.
- Taxodium distichum*. S. Taynult, 8. U. Burghclere, 12, R.B.G.E., Kew, Wormley Bury over 100.
- Taxus baccata*. G. Stratford-on-Avon, 50. B. Aberfoyle, Farnham, Kirkcowan, Snowhill; S. Keddleston Hall, 25, Middlesbrough, Watlington, 26. U. R.B.G.E., Kew.
- Telopea truncata*. K. Goring-by-Sea, 17, Kew. G. Ardingly, 10. B. R.B.G.E. S. Leith Vale, 20. U. Bodnant, Rhu, 10, Wisley.
- Tetracentron sinense*. U. Crathes, 3, R.B.G.E., Goring-by-Sea, Kew, †.
- Teucrium fruticans*. K. Bodnant, Wisley, Wormley Bury. G. Minehead. Z. R.B.G.E.
- fruticans azureum*. K. Northampton † S. 6, Oxford, † S.E. 2. U. Isles of Scilly, Kew, †. Z. R.B.G.E.
- Thuja plicata*. S. How Mill, 70. U. R.B.G.E., Kew.
- Trachelospermum jasminoides*. K. Wisley. G. Delmonden, Henfield. S. Salcombe, † 20. U. Bodnant, Goring-by-Sea, Isles of Scilly, Kew. Z. R.B.G.E.
- **Tritonia Tuckeri*. K. Whitechurch, 5. Z. R.B.G.E.

- Ulex-europaeus*. K. Beaconsfield, 12, Leith Vale. K. & B. Claverley, 12.
G. Langbank. B. Kew. U. R.B.G.E.
europaus plenus. G. Wisley.
hibernica. U. Leith Vale.
- Vaccinium glauco-album*. K. Burghclere, 8, Leith Vale. U. R.B.G.E.
Vallea stipularis. K. Goring-by-Sea. S. Kew, †. Z. R.B.G.E.
Verbascum spinosum. B. Wisley.
sps. K. Uplawmoor. B. & K. R.B.G.E.
- Veronica Hulkeana*. K. Burghclere, 4, Bridgnorth, Christchurch, 10,
Dunster, Henfield, Oxford, Wisley. G. Bodnant. S. R.B.G.E.
U. Goring-by-Sea, Kew, †.
- Lavaudiana*. K. Bridgnorth, R.B.G.E., Goring-by-Sea, Oxford.
S. Kew, †.
salicifolia. K. Goring-by-Sea, some survived, Leith Vale, Sutton
Scotney. G. Wisley. B. R.B.G.E., Northampton, 32, Oxford.
S. Helsby, Kew, †.
- speciosa*. K. Basingstoke, 6, Goring-by-Sea. B. R.B.G.E., Kew.
various (*sp.* or hybrids unnamed). K. Teignmouth. K. & B.
Osmington, 7, Swansea. B. Stonegate. S. Carradale, 15. Some
B. R.B.G.E. none K. Isles of Scilly.
- Viburnum buddleifolium*. B. Campden. U. Goring-by-Sea, Kew.
Carlesii. K. Oxford. U. R.B.G.E.
cylindricum. G. Guildford. U. R.B.G.E., Kew.
**erubescens*. S. Crathes, 7. U. Kew. Z. R.B.G.E.
foetens. S. Leith Vale.
foetidum. B. Nutley, 20. U. R.B.G.E., Kew.
fragrans. S. Leith Vale. U. Burghclere, 12, R.B.G.E., Goring-
by-Sea, Helsby, 18, Kew, Uplawmoor, 15, Wormley Bury, 20.
**grandiflorum*. K. Oxford, 1. U. Burghclere, 10, Crathes, 10,
R.B.G.E., Goring-by-Sea, Leith Vale, Kew.
macrocephalum. B. Burghclere, 9, Oxford. U. Bodnant, Goring-
by-Sea, Kew. Z. R.B.G.E.
odoratissimum. S. R.B.G.E., Salcombe, 30. U. Kew, †.
Tinus. K. Basingstoke, 30, Stratford-on-Avon. G. Abingdon, 30,
Bridgnorth, Glencarse. B. Great Amwell, Chiddingfold, Leith
Vale, Uplawmoor, 15. U. R.B.G.E., Goring-by-Sea, Isles of
Scilly, Kew. Wormley Bury, 50.
- Vitex lucens*. K. & G. Isles of Scilly, 100. U. Kew. Z. R.B.G.E.
Vitis Coignetiae. K. Leith Vale. D. Dorchester. U. Burghclere, 10,
R.B.G.E., Kew. Wormley Bury, † S. 10.
- Weinmannia trichosperma*. K. Cuckfield, Kew. U. Isles of Scilly. Z.
R.B.G.E.
- Wisteria floribunda f. macrobotrys (multijuga)*. B. Londonderry, † 6. U.
R.B.G.E., Goring-by-Sea, Kew.
sinensis. B. Lamberhurst, 100. U. R.B.G.E., Kew. Wormley
Bury about 100.
- Yucca gloriosa*. U. Kew.
recurvifolia. U. Kew.
sp. G. Hitchin. B. Leith Vale. U. R.B.G.E.
- Zauschneria latifolia*. B. Wisley.
- Zenobia pulverulenta*. K. Wormley Bury, 15. B. Dunchidcock, 7, Leith
Vale. S. Birstwith, Burghclere, 10, Kew. U. R.B.G.E.

Extracts from THE PROCEEDINGS OF THE ROYAL HORTICULTURAL SOCIETY

GENERAL MEETINGS

SEPTEMBER 23, 1947

FRUIT AND VEGETABLE COMMITTEE—Mr. F. A. SECRETT, C.B.E., in the Chair, and fourteen other members present.

Awards Recommended :

Silver-gilt Knightian Medal

To Messrs. Watkins & Simpson, Ltd., 27 Drury Lane, Covent Garden, W.C. 2, for a collection of Carrots and Tomatoes.

Silver Knightian Medal

To Eastern Command Horticultural Department, Horticultural Educational and Advisory Bureau, Hextable, Kent, for a group of Vegetables.

The following Awards were recommended after trial at Wisley:

Award of Merit

To Celery 'Golden Self-Blanching,' sent by Messrs. Watkins & Simpson, Ltd., 27 Drury Lane, Covent Garden, W.C. 2.

To Celery 'Golden Self-Blanching,' sent by Messrs. A. L. Tozer, Ltd., Pyports, Church Street, Cobham, Surrey.

To Celery 'Non-Bolting Golden Plume,' sent by the Ferry-Morse Seed Co., San Francisco, California, U.S.A.

To Tomato 'Danish Export,' sent by Messrs. L. Daehnfelt, Ltd., Odense, Denmark.

To Tomato 'All Set,' sent by Messrs. Nutting & Sons, Ltd., Warwick Wold, Merstham, Surrey.

To Runner Bean 'Sutton's Prizewinner,' sent by Messrs. Sutton & Sons, Ltd., Reading.

Highly Commended

To Tomato 'Harbinger' (Nutting & Sons Selection), sent by Messrs. Nutting & Sons, Ltd., Warwick Wold, Merstham, Surrey.

Other Exhibits

Collection of Grapes and Melons, from the Director, R.H.S. Gardens, Wisley.

Group of Strawberry Grapes, from Six Hill Nursery, Ltd., Stevenage, Herts.

Peach 'Diana Grace,' from Miss D. G. Miles, 26 Greenway Lane, Chippenharn, Wilts.

Plum 'Invicta,' from C. E. Botwright, Esq., Ridley Villas, 56 Henniker Road, Ipswich, Suffolk.

Seeding Apples Nos. 1 and 2, from C. G. K. Edsall, Esq., 87 Brookdene Avenue, Oxhey, Watford, Herts.

Seedling Pear, from R. Chevallier Preston, Esq., The Hall, Donaghcloney, Co. Down, North Ireland.

Seedling Apple, from Miss E. Hopkinson, Wynstay, Balcombe, Sussex.

Apples 'Warrior' and 'Elegance,' from W. H. P. Stockham, Esq., Rothesay, Harefield Road, Uxbridge, Middlesex.

Apple 'Pinner Seedling,' from H. H. Crane, Esq., Highmead, Cheney Lane, Eastcote, Pinner, Middlesex.

Seedling Apple, from The Lady Wardington, Manor House, Wardington, Banbury.

Seedling Apple, from H. T. Brockton, Esq., 38 Preston Hill, Kenton, Harrow, Middlesex.

FLORAL COMMITTEE A—Mr. G. W. LEAK, V.M.H., in the Chair, and fourteen other members present.

Awards Recommended :

Gold Medal

To Messrs. Dobbie & Co., Ltd., Edinburgh, for an exhibit of Dahlias.

To Messrs. Stuart Ogg, Swanley, for an exhibit of Dahlias.

Silver-gilt Flora Medal

To W. P. Wood, Esq., Caterham, for an exhibit of Fuchsias.

Silver-gilt Banksian Medal

To Messrs. Brown & Such, Ltd., Maidenhead, for an exhibit of Dahlias.

To Mr. A. Hurran, Gloucester, for an exhibit of Fuchsias.

To Messrs. J. F. Spencer & Son, Ltd., Hockley, for an exhibit of Dahlias.

Silver Flora Medal

To Messrs. Biddlecombe Bros., Bracknell, for an exhibit of Chrysanthemums.

To Messrs. Blackmore & Langdon, Bath, for an exhibit of Begonias.

To Messrs. J. Cheal & Sons, Ltd., Crawley, for an exhibit of Dahlias.

To Messrs. H. Woolman, Ltd., for an exhibit of Chrysanthemums.

Silver Banksian Medal

To Messrs. Allwood Bros., Ltd., Haywards Heath, for an exhibit of Carnations.

To Messrs. E. F. Fairbairn & Son, Carlisle, for an exhibit of Dahlias.

To Messrs. Napier, Taunton, for an exhibit of Chrysanthemums.

Flora Medal

To Mr. H. A. Brown, Chingford, for an exhibit of Fuchsias.

To Messrs. Kelway & Son, Ltd., Langport, for an exhibit of Gladioli.

To Messrs. Wilson & Clark, Cricklewood, for an exhibit of Chrysanthemums.

Banksian Medal

To Messrs. Hale & May, Ltd., Cookham, for an exhibit of Roses.

To Mr. E. V. Roe, Reigate, for an exhibit of Chrysanthemums.

To Mr. Stephen Sims, Draycott, for an exhibit of Dahlias, Chrysanthemums, etc.

To Messrs. Wheatcroft Bros., Ltd., Nottingham, for an exhibit of Roses.

Other Exhibits

Chrysanthemums, etc., from Day Spring Flowers, Ripley, Surrey.

Fuchsias 'C. J. Howlett,' 'Lord Lonsdale,' 'Queen Mary,' and others, from C. J. Howlett, Esq., Earley, Reading. To be seen again with plants.

Michaelmas Daisy seedling, from O. G. R. Fox, Esq., North Finchley.

FLORAL COMMITTEE B—Lord ABERCONWAY, C.B.E., V.M.H., in the Chair, and twenty-one other members present.

Awards Recommended :**Silver-gilt Banksian Medal**

To the Winkfield Manor Nurseries, Ascot, for an exhibit of rock garden plants.

To Messrs. J. Cheal & Sons, Crawley, for an exhibit of flowering and foliage shrubs

Silver Flora Medal

To Messrs. Hillier & Sons, Winchester, for an exhibit of flowering and foliage shrubs.

Flora Medal

To Messrs. Carlile, Twyford, for an exhibit of herbaceous plants.

To Messrs. L. R. Russell, Ltd., Windlesham, for an exhibit of flowering and foliage shrubs.

To Messrs. Hale & May, Cookham, for an exhibit of herbaceous plants.

To Messrs. Robinson, Eltham, for an exhibit of rock garden plants.

To the Pillhead Flower Farm, Bideford, for an exhibit of hybrid Gerberas.

Banksian Medal

To Mr. J. Klinkert, Richmond, for an exhibit of clipped Box trees.

To Messrs. Burkwood & Skipwith, Ltd., Kingston, for an exhibit of flowering and foliage shrubs.

To Orchard Neville Nurseries, Ltd., Baltonsborough, for an exhibit of rock garden plants.

To Mr. C. Newberry, Bulls Green Nursery, Knebworth, for an exhibit of Gentians.

Award of Merit

To *Salvia Pitcheri* 'African Skies' shown under name 'Buller's Variety' as a hardy flowering plant (votes unanimous), from Mr. J. E. Elliott, Broadwell Nurseries, Moreton-in-the-Marsh.

To *Viburnum lobophyllum* as a hardy, ornamental-fruited shrub (votes 15 for o against), from Lord Aberconway, C.B.E., V.M.H., Bodnant, N. Wales.

Cultural Commendation

To Lt.-Col. M. P. Ansell, D.S.O., Pillhead Flower Farm, Bideford, for an exhibit of hybrid Gerberas.

Other Exhibits

Clerodendron foetidum, exhibited by G. P. Baker, Esq., V.M.H., Sevenoaks.

Euonymus planipes, *Nothopanax Davidii*, exhibited by Lord Aberconway. C.B.E., V.M.H., Bodnant.

Malus sp., exhibited by Capt. Collingwood Ingram, Benenden.

Nymphaea 'Emily Grant Hutchings,' exhibited by Messrs. Perry, Enfield.

Sorbus americana, exhibited by the Commissioners of Crown Lands, Windsor Great Park.

JOINT DAHLIA COMMITTEE—Mr. E. CHEAL in the Chair, and eight other members present.

Selected for trial at Wisley

'Moeder Ballego,' from Messrs. J. G. Ballego & Sons, Leiden, Holland.

'Elsie Newsom,' 'Pearlette,' 'Ruby Glow,' 'Sunglow,' from Mr. A. T. Barnes, Bedford.

'E. G. Ramsey,' from Mr. Stuart Ogg, Swanley.

'Fuse,' 'Ice-cream,' 'Judy,' 'Lily Vandyk,' from Messrs. J. Stredwick & Son, St. Leonards-on-Sea.

To be seen again

'Birdie' and one other variety, subject to renaming, from Messrs. J. Stredwick & Son, St. Leonards-on-Sea.

JOINT EARLY-FLOWERING CHRYSANTHEMUM COMMITTEE—Mr. G. W. LEAK, V.M.H., in the Chair, and twelve other members present.

Awards Recommended :*Award of Merit*

To 'Royal Prince,' for exhibition (votes 8 for, 0 against), shown by Mr. H. Woolman, Sandy Hill Nurseries, Shirley, Birmingham. (See p. 26.)

To 'Monsal Dale,' for exhibition (votes 8 for, 0 against), and 'Tibshelf Shell' for exhibition (votes 10 for, 0 against), raised and shown by Messrs. J. & T. Johnson, Tibshelf, Derbyshire. (See p. 26.)

Selected for trial at Wisley

'Royal Prince,' from Mr. H. Woolman, Shirley, nr. Birmingham.

'Pat' (a pompon), 'Ansom,' 'Monsal Dale,' 'Monsal Head' and 'Tibshelf Shell,' all from Messrs. J. & T. Johnson, Tibshelf, Derbyshire.

Other Exhibits

'Dorean,' from Capt. R. F. Winter, Sherbourn House, Earham, nr. Chichester.

'Cheltenham,' from Mr. H. Woolman, Shirley, Birmingham.

'Henry Ivill' and 'Winchester Beauty' (a spray variety), to be seen again, from Mr. W. H. Harrison, Park Road Nursery, Winchester.

SEPTEMBER 30, 1947

JOINT EARLY-FLOWERING CHRYSANTHEMUM COMMITTEE—Mr. G. W. LEAK, V.M.H., in the Chair, and twelve other members present.

Awards Recommended :*Award of Merit*

To 'Golden Harvest,' for exhibition (votes 12 for, 0 against); 'Mayford Pink,' for exhibition (votes 12 for, 0 against); 'Merlin,' for exhibition (votes 12 for, 0 against), and 'Roselight,' for exhibition (votes 12 for, 0 against), all raised and shown by Messrs. H. Shoesmith, Ltd., Mayford, Woking, Surrey. (See pp. 25 and 26.)

To 'Pink Una,' sport from 'Una,' for exhibition (votes 10 for, 0 against), shown by Mr. W. H. Dixon, Horsham Nursery, Horsham, Sussex. (See p. 26.)

Selected for trial at Wisley

'Golden Harvest,' 'Mayford Pink,' 'Merlin,' 'Roselight' and 'Sunshine,' from Messrs. H. Shoesmith, Ltd., Mayford, Woking, Surrey.

'Pink Una,' from Mr. W. H. Dixon, Horsham Nursery, Horsham, Sussex.

Other Exhibits

'Nomad,' from Mr. W. H. Dixon, Horsham.

'Mary Ann,' 'Primrose Barbara' (to be seen again); 'Swan' and 'White Globe' (to be seen again), all from Messrs. H. Shoesmith, Ltd., Mayford, Woking, Surrey.

The awards to the varieties in the trials at Wisley were confirmed.

OCTOBER 7, 1947

SCIENTIFIC COMMITTEE—Mr. E. A. BOWLES, M.A., F.L.S., F.R.E.S., V.M.H., in the Chair, and three other members present.

Euphorbia marginata—Mr. Bowles showed a specimen of *Euphorbia marginata* with a large and more compact head of flowers.

FRUIT AND VEGETABLE COMMITTEE—Mr. F. A. SECRETT, C.B.E., in the Chair, and thirty-one other members present.

Awards Recommended :*Gold Medal*

To The Governors of St. Andrew's Hospital, Northampton, for a group of Vegetables (31 for, 0 against).

To Messrs. Sutton & Sons, Ltd., Seedsmen, Reading, for a group of Vegetables (31 for, 0 against).

To Messrs. Toogood & Son, Ltd., Seedsmen, Southampton, for a group of Vegetables (31 for, 0 against).

Silver-gilt Hogg Medal

To the Rt. Hon. Lord Swaythling, Townhill Park, West End, Southampton, for a collection of Fruit.

To Messrs. Laxton Bros., Ltd., High Street, Bedford, for a group of Apples.

Silver Hogg Medal

To The Principal, Hertfordshire Institute of Agriculture, Oaklands, St. Albans, for a group of Apples and Pears.

To The Sunningdale and District Professional Gardeners' Association, for a group of Apples and Pears.

Bronze Hogg Medal

To Mark Ostrer, Esq., King's Beeches, Sunninghill, Ascot, for a group of Grapes.

The following Awards were recommended after trial at Wisley.

Highly Commended

To Marrow 'Bush Green,' sent by Messrs. Watkins & Simpson, Ltd., 27 Drury Lane, Covent Garden, London, W.C. 2.

To Marrow 'Bush Green: Special Early Selection,' sent by Messrs. G. A. Bunting & Co., 3-9 Bucknall Street, New Oxford Street, London, W.C. 2.

To Marrow 'Long Cream' (subject to naming), sent by Messrs. Yates & Son (Seeds) Ltd., Evesham.

To Marrow 'Long Trailing,' sent by Messrs. Watkins & Simpson, Ltd., 27 Drury Lane, Covent Garden, London, W.C. 2.

To Marrow 'Sutton's Long Green,' sent by Messrs. Sutton & Sons, Ltd., Reading.

Other Exhibits

Group of Apples and Walnuts, from The Director, East Malling Research Station, near Maidstone.

Group of Apples, from The Director, John Innes Horticultural Institute, Mostyn Road, Merton Park, London, S.W. 19.

Group of Apples, from The National Fruit Trials, Wisley.

Group of Ornamental Gourds, from J. B. Proper, Esq., 2 Cotsford Avenue, New Malden, Surrey.

Seedling Apple, from Mrs. D. M. Caldecott-Smith, Ockwells Manor, near Maidenhead.

Apple 'Bennett's Seedling,' from J. R. Bennett, Esq., 19 Sandfield Road, St. Albans, Herts.

Apples 'Golden Russet,' 'Philip Longly' and 'Turnpike Pippin,' from Mr. F. B. Longly, Nurseryman, Old London Road, Hythe, Kent.

Seedling Plum, from L. Cleeve, Esq., Owlsfield, Gore Road, New Milton.

Apple 'Luxury,' from T. W. Lee, Esq., 62 Oakfield Lane, Dartford, Kent.

Seedling Apple, from A. H. Weaver, Esq., Fordham, 4 Mangotsfield Road, Mangotsfield, near Bristol.

Apple 'George's Delight,' from Capt. J. Roberts-George, Manor House, Thurnby, Leics.

Apple 'Grandfather Bartlett,' from R. W. Yeomans, Esq., Chilton Farm, Fleet Road, Cove, Hants.

Apple 'Barbara Brooks,' from G. H. Brooks, Esq., 59 Pembroke Street, Bedford.

Apples 'Spartan' and 'Gladiator,' from W. F. P. Stockham, Esq., Rothesay, 211 Harefield Road, Uxbridge, Middlesex.

Seedling Plum, from W. Booker, Esq., Oakham House, Ebrington, near Chipping Campden, Glos.

Seedling Apple, from Mrs. B. Bouquet, Pound House, Dorking, Surrey.

FLORAL COMMITTEE A—Mr. G. W. LEAK, V.M.H., in the Chair, and fourteen other members present.

Awards Recommended :

Gold Medal

- To Messrs. Napier, Taunton, for an exhibit of Chrysanthemums.
- To Mr. Stuart Ogg, Swanley, for an exhibit of Dahlias.

Silver-gilt Banksian Medal

- To Messrs. Brown & Such, Ltd., Maidenhead, for an exhibit of Dahlias.
- To Messrs. J. F. Spencer & Son, Ltd., Hockley, for an exhibit of Dahlias.
- To Messrs. A. G. Vinten, Ltd., Balcombe, for an exhibit of Chrysanthemums.
- To Messrs. Wm. Wood & Son, Ltd., Taplow, for an exhibit of Michaelmas Daisies.

Silver Flora Medal

- To Messrs. Allwood Bros. Ltd., Haywards Heath, for an exhibit of Carnations.
- To Messrs. Bakers Nurseries Ltd., Codsall, for an exhibit of Chrysanthemums and Michaelmas Daisies.
- To Mr. H. Woolman, Birmingham, for an exhibit of Chrysanthemums.

Silver Banksian Medal

- To Messrs. T. Carlile Ltd., Twyford, for an exhibit of Michaelmas Daisies.
- To Messrs. J. Cheal & Sons Ltd., Crawley, for an exhibit of Dahlias.
- To Messrs. K. Luxford, Sawbridgeworth, for an exhibit of Chrysanthemums.
- To Messrs. G. & R. Perry, Enfield, for an exhibit of Michaelmas Daisies, Chrysanthemums, etc.

Flora Medal

- To Messrs. Blackmore & Langdon, Bath, for an exhibit of Phloxes, Chrysanthemums, etc.
- To Messrs. M. Prichard & Sons Ltd., Christchurch, for an exhibit of herbaceous plants.
- To Mr. E. V. Roe, Reigate, for an exhibit of Chrysanthemums.

Banksian Medal

- To Messrs. Biddlecombe Bros., Bracknell, for an exhibit of Chrysanthemums.
- To Messrs. R. Gill & Son, Penryn, for an exhibit of Anemones.
- To Messrs. Hale & May Ltd., Cookham, for an exhibit of Michaelmas Daisies, etc.
- To Messrs. Hale & May Ltd., Cookham, for an exhibit of Roses.
- To Mr. G. J. Howlett, Earley, for an exhibit of Fuchsias.
- To the Orpington Nurseries Co. Ltd., Orpington, for an exhibit of Korean Chrysanthemums.
- To Messrs. Wheatcroft Bros. Ltd., Nottingham, for an exhibit of Roses.

Award of Merit

- To Fuchsia 'Queen Mary' (votes 14 for, 0 against) for exhibition or for use as an ornamental pot plant, from Mr. C. J. Howlett, Earley, Reading. (See p. 27.)
- To Fuchsia subject to naming (votes 14 for, 0 against) as a variety for use as an ornamental pot plant from Mr. C. J. Howlett, Earley, Reading. (See p. 26.)

Selected for trial at Wisley

- Aster 'Albanian' and Aster 'Jean,' from Messrs. E. C. Simmonds & Son, St. Albans.
- Lilliputt Chrysanthemum 'Isis,' from Mr. H. Woolman, Birmingham.

Other Exhibits

- Asters from Mr. F. E. Dawkins, Little Baddow.
- Chrysanthemum 'The Cardinal,' from Messrs. Bakers Nurseries Ltd., Codsall.
- Chrysanthemums from Messrs. Wilson & Clark, London.
- Hippeastrums (to be seen again) from the Director, R.H.S. Gardens, Wisley.

FLORAL COMMITTEE B—Mr. E. A. BOWLES, M.A., F.L.S., in the Chair, and twenty-three other members present.

Awards Recommended :

Silver-gilt Banksian Medal

- To Messrs. J. Cheal & Sons, Crawley, for an exhibit of foliage and berried shrubs.
- To Messrs. Hillier & Sons, Winchester, for an exhibit of foliage and berried shrubs.
- To Sir Henry Price, Ardingly, for an exhibit of berried shrubs and trees.
- To Messrs. L. R. Russell, Ltd., Windlesham, for an exhibit of foliage and berried shrubs.

Silver Flora Medal

To Messrs R. Gill & Son, Penryn, for an exhibit of evergreen Rhododendrons.

To Messrs. R. C. Notcutt, Ltd., Woodbridge, for an exhibit of foliage and berried shrubs.

Flora Medal

To Winkfield Manor Nurseries, Ascot, for an exhibit of rock garden plants.

Banksian Medal

To Messrs. Burkwood & Skipwith, Ltd., Kingston, for an exhibit of foliage and berried shrubs.

To Kew Topiary Nurseries, Richmond, for an exhibit of clipped Box trees.

To Mr. Stephen Sims, Draycot, for an exhibit of Conifers.

Award of Merit.

To *Hosta tardiflora* as a hardy, herbaceous, flowering plant (votes unanimous), from the Director, Royal Botanic Gardens, Kew. (See p. 27.)

To *Polystichum angulare plumosum grande* as a hardy Fern (votes unanimous), from Mr. W. B. Cranfield, East Lodge, Enfield Chase. (See p. 28.)

Other Exhibits

Canna iridiflora var. *Ehermannii*, *Euphorbia marginata*, from Mr. E. A. Bowles, M.A., F.L.S., Enfield.

Cotoneaster conspicua var. *decora*, *Rosa highdownensis*, *Viburnum betulifolium*, from Col. F. C. Stern, O.B.E., M.C., Goring-by-Sea.

Crocus speciosus albus, from Miss C. Beck, Ware.

Euonymus europaeus fructu-coccineo, *Sorbus scalaris*, from Mr. W. Bentley, Newbury.

Lespedeza Thunbergii, from the Director, R.B.G., Kew.

Pyracantha cremulata, *Brachycarpus excelsa* (fruiting spray), from Sir Giles Loder, Bt., Horsham.

Salix repens argentea, *Campsis radicans* (fruiting), from Messrs. G. Jackman & Sons, Ltd., Woking.

Salvia Pitcheri, *Buller's Variety*, from Mr. J. Elliott, Moreton-in-the-Marsh.

Sinofranchetia chinensis (fruiting sprays), from Sir Henry Price, Ardingly.

ORCHID COMMITTEE—Mr. GURNEY WILSON, F.L.S., V.M.H., in the Chair, and eight other members present.

Award Recommended :**Silver Banksian Medal**

To Messrs. Sanders, St. Albans, for a group of Orchids.

JOINT DAHLIA COMMITTEE—Mr. G. MONRO, C.B.E., V.M.H., in the Chair, and ten other members present.

Selected for trial at Wisley

'Newnham White,' 'Pristine,' from Mr. A. T. Barnes, Bedford.

'Dickson,' 'Redwing,' from Messrs. Brown & Such Ltd., Maidenhead.

Unnamed seedling subject to naming, from Mr. W. F. Lucking, Little Thurrock, Essex.

'Fondant,' 'Lorna,' 'Solferino,' from Messrs. J. F. Spencer & Son Ltd., Hockley.

'Pinwheel,' 'Sea Swallow,' 'Vera Stephens' and two other varieties subject to re-naming, from Messrs. J. Stredwick & Son, St. Leonards-on-Sea.

Dahlias were also submitted by Mr. G. Burns, Ware ; Mr. J. C. Ottaway, Epsom.

OCTOBER 21, 1947

SCIENTIFIC COMMITTEE—Mr E. A. BOWLES, M.A., F.L.S., F.R.E.S., V.M.H., in the Chair, and six other members present.

Pea Crosses—Mr. Marsden-Jones gave an account of his work in crossing the field Pea (*Pisum arvense*) 'Maple' (which is straggly in growth) with the garden Peas 'Union Jack' and 'Onward.' This was begun in 1943. He had now obtained a new variety of 'Maple' type, but dwarfier and with larger seeds. The seeds of this variety exhibited were brown with a marked cavity or indent characteristic of 'Maple.'

Bean Crosses—Mr. Marsden-Jones also exhibited a series of Bean (*Vicia Faba*) seeds and pods showing the segregates obtained from a natural cross between a field or horse Bean and a 'Windsor' Bean. These ranged in type from one very like a field Bean to one indistinguishable from a 'Long Pod.'

FRUIT AND VEGETABLE COMMITTEE—Mr. F. A. SECRET, C.B.E., in the Chair, and eleven other members present.

Award Recommended :

Silver Hogg Medal

To P. G. Saunders, Esq., 29 Briton Hill Road, Sanderstead, Surrey, for a Group of Apples.

Other Exhibits

Seedling Apple, from Mrs. E. J. Ford, 29 Hayes Road, Paignton, Devon.

Apple 'Leckford Beauty,' from Miss E. F. Chawner, The White House, Leckford, Stockbridge, Hants.

Seedling Apples, from P. Chambers, Esq., Sheepway Court, Maidstone, Kent.

Seedling Apple, from E. Luff, Esq., 113 Sandgate Road, Hall Green, Birmingham 28.

FLORAL COMMITTEE A—Mr. G. W. LEAK, V.M.H., in the Chair, and twelve other members present.

Awards Recommended :

Gold Medal

To Col. Stephenson R. Clarke, C.B., LL.D. (gr. Mr. W. Fleming), Haywards Heath, for an exhibit of Nerines.

To Mr. Stuart Ogg, Swanley, for an exhibit of Dahlias.

To Messrs. A. G. Vinten, Ltd., Balcombe, for an exhibit of Chrysanthemums.

Silver-gilt Banksian Medal

To Messrs. Brown & Such, Ltd., Maidenhead, for an exhibit of Dahlias.

To Messrs. T. van der Schilden, Aalsmeer, Holland, for an exhibit of Begonias, Cyclamens, Primulas, etc.

Silver Flora Medal

To Messrs. Bakers Nurseries, Ltd., Codsall, for an exhibit of Michaelmas Daisies, Chrysanthemums and other herbaceous plants.

To Messrs. Blackmore & Langdon, Bath, for an exhibit of Phlox, Chrysanthemums, Delphiniums, etc.

To Messrs. Napier, Taunton, for an exhibit of Chrysanthemums.

To Messrs. John Waterer, Sons & Crisp, Ltd., Twyford, for an exhibit of Michaelmas Daisies and Chrysanthemums.

To Messrs. Wm. Wood & Son, Ltd., Taplow, for an exhibit of Chrysanthemums and Michaelmas Daisies.

Silver Banksian Medal

To Messrs. Napier, Taunton, for an exhibit of Carnations.

To Orpington Nurseries, Co., Ltd., Orpington, for an exhibit of Korean Chrysanthemums.

To Messrs. G. & R. Perry, Enfield, for an exhibit of herbaceous plants, ferns and aquatics.

To Mr. E. V. Roe, Reigate, for an exhibit of Chrysanthemums.

Flora Medal

To Messrs. Allwood Bros., Ltd., Haywards Heath, for an exhibit of Carnations.

Banksian Medal

To Mr. Stephen Sims, Draycott, for an exhibit of Chrysanthemums, Dahlias, and Conifers.

Award of Merit

To Nerine 'Queen Mary' as a cool greenhouse flowering plant (votes 12 for, 0 against), from W. B. Cranfield, Esq., V.M.H. (gr. Mr. H. Barnett), Enfield Chase. (See p. 27.)

Selected for trial at Wisley

Dahlia 'Flare' from Messrs. Brown & Such, Ltd., Maidenhead.

Other Exhibits

Dahlias from Messrs. J. F. Spencer & Son, Ltd., Hockley.

Gazanias from Mr. R. D. Lainson, Piltown.

Hippeastrums (to be seen again), from Mr. A. G. Buller, Dwarsrivershoek, S. Africa, through the Director, R.H.S. Gardens, Wisley.

Roses from Messrs. Wheatcroft Bros., Ltd., Nottingham.

FLORAL COMMITTEE B—Mr. E. A. BOWLES, M.A., F.L.S., in the Chair, and seventeen other members present.

Awards Recommended :

Silver-gilt Banksian Medal

To Messrs. J. Waterer, Sons & Crisp, Ltd., Bagshot, for an exhibit of foliage and berried trees and shrubs.

Silver Flora Medal

To Messrs. Hillier & Sons, Winchester, for an exhibit of foliage and berried trees and shrubs.

Flora Medal

To Knap Hill Nursery Co., Woking, for an exhibit of foliage and berried trees and shrubs.

Banksian Medal

To Messrs Burkwood & Skipwith, Ltd., Kingston, for an exhibit of foliage and berried shrubs.

To Kew Topiary Nurseries, Richmond, for an exhibit of clipped box trees.

To Orchard Neville Nurseries, Baltonsborough, for an exhibit of rock garden plants and shrubs.

To Mr. J. O. Sherrard, Newbury, for an exhibit of foliage and berried trees and shrubs.

To Mr. F. Street, Woking, for an exhibit of foliage and berried shrubs.

Award of Merit

To *Clytostoma purpureum*, as a flowering plant for the greenhouse (votes unanimous), from the Director, Royal Botanic Gardens, Kew.

To *Phyllitis Scolopendrium crispa* 'Christopher Robinson,' as a hardy fern (votes 14 for, 0 against), from W. B. Cranfield, Esq., F.L.D., V.M.H., East Lodge, Enfield Chase.

To *Sorbus × kewensis* (? *pohuashanensis* × *Esserteauiana*), as a hardy, ornamental-fruited tree (votes 13 for, 0 against), from the Director, Royal Botanic Gardens, Kew.

To *Symplocos paniculata*, as a hardy, ornamental-fruited tree (votes unanimous), from the Commissioners of Crown Lands, Windsor.

Preliminary Commendation

To *Bougainvillea alba*, as a tender flowering climber (subject to verification of name, votes unanimous), from W. J. Kaye, Esq., Chantry Lodge, Longdown, Guildford.

Other Exhibits

Decasnea Fargesii, exhibited by Messrs. G. Jackman, Woking.

Fraxinus oxycarpa Raywood Variety, *Ulmus glabra* var. *suberosa*, exhibited by Capt. Collingwood Ingram, Benenden.

Galanthus nivalis subsp. *Rachelae*, exhibited by Col. F. C. Stern, O.B.E., M.C., Goring-by-Sea.

Gentians, exhibited by Mr. Newberry, Knebworth.

Ilex macrocarpa, exhibited by the Director, Royal Botanical Gardens, Kew.

Window-boxes, exhibited by Dayspring Nurseries, Ripley, Surrey.

ORCHID COMMITTEE—Mr. GURNEY WILSON, F.L.S., V.M.H., in the Chair, and five other members present.

Awards Recommended :

Silver Flora Medal

To Messrs. Charlesworth & Co., Haywards Heath, for a group of Orchids.

To Messrs. Stuart Low & Co., Jarvis Brook, for a group of Orchids.

Award of Merit

To *Laeliocattleya* 'Sunburn' var. 'Alaric' (*Lc.* 'Golden Sunset' × *Lc.* 'Mrs. Medo') (votes 5 for, 0 against), from Messrs. Charlesworth & Co., Haywards Heath. (See p. 26.)

To *Brassolaeliocattleya* 'Normans Bay' var. Royal Bride' (*Lc.* 'Ishtar' × *Bc.* 'Hartland') (votes 5 for, 0 against), from Messrs. Stuart Low & Co., Jarvis Brook. (See p. 25.)

Extracts from THE PROCEEDINGS OF THE ROYAL HORTICULTURAL SOCIETY

REPORT OF THE COUNCIL

TO THE ONE HUNDRED AND FORTY-FOURTH ANNUAL MEETING OF THE SOCIETY, TO BE HELD IN THE LECTURE ROOM OF ITS NEW HALL, GREYCOAT STREET, WESTMINSTER, AT 3 P.M. ON TUESDAY, FEBRUARY 17, 1948.

ENGLISH weather has always been a never-failing topic for conversation and the year 1947 has given us far more to talk about than usual. The most severe winter in the south of England for many years was followed by a very fine and dry summer, the rainfall being much below the average. This unusual weather has had a considerable effect on horticulture. Work on the land was delayed in the spring, and even those fortunate enough to possess glass, which it was permissible to heat, found it difficult to maintain adequate temperatures owing to lack of fuel.

Nevertheless, the standard of exhibits at the Society's Shows, both in the halls and at Chelsea has been high. The attendance at the Shows was very gratifying and it is obvious that the increased interest shown by the general public, and noted in last year's Report, has been well maintained. The attendance at the Chelsea Show was fully comparable with that of pre-war years.

The Council records, with great appreciation, the fact that the Fellowship of the Society is still rising, as will be seen from the figures given below. Although the total Fellowship has not yet reached the highest figures of the best years before the war, it is hoped that, if the present rate of increase is maintained, those figures will be reached in the course of the next year or two.

The Council has decided to introduce a new class of Fellowship for the benefit of those Fellows who live overseas. These Fellows do not enjoy the same opportunities of availing themselves of all the privileges of Fellowship which are enjoyed by those who reside in this country. In particular, it is impossible for them, except on their visits to England, to attend the Society's shows, lectures, etc. It does not seem, therefore, equitable to expect them to pay the full rates of subscription, and it has been decided that the overseas Fellows should, in future, be admitted to the Society on payment of an annual subscription of one guinea, for which they will receive the Society's JOURNAL, free technical advice by letter, and a share in the distribution of surplus seeds. They will be entitled to vote at any meeting of the Society which they may be able to attend, and to propose anyone for election as a Fellow. An overseas Fellow, when on a visit to the United Kingdom, will also receive a non-transferable personal ticket admitting him to Shows and the Society's Gardens; this ticket being valid for the duration of his visit or for a period of three months, whichever is the less.

The Council is grateful to all Fellows for their continued support of the Society. This support enables the Society to press ahead with its plans for the improvement of the services of the Society in London and of the Gardens at Wisley.

The Fellowship of the Society as on November 4, 1947, was as follows:—

LOSS BY DEATH IN 1947				ELECTIONS IN 1947			
Honorary Fellows	..	6		Associates of Honour	..	12	
Associates of Honour	..	7		Life Fellows	..	22	
Life Fellows	..	16		4 Guinea Fellows	..	158	
4 Guinea Fellows	..	7		3 " "	..	1561	
3 " "	..	123		2 " "	..	2499	
2 " "	..	238		Associates	..	177	
Associates	..	4		Affiliated Societies	..	192	
		401				4621	
LOSS BY RESIGNATION				ADMISSIONS IN 1947			
4 Guinea Fellows	..	35		Student Members	..	12	
3 " "	..	284					
2 " "	..	1152					
Associates	..	70					
Affiliated Societies	..	67					
		1608					
Less reinstated	..	256					
		1352					
				SUMMARY FOR 1947			
				Elections and Admissions		4633	
				Resignations and Deaths		1753	
				Net increase	...	2880	
				Total on Nov. 5, 1946	..	27,358	
				Total on Nov. 4, 1947	..	30,238	
				Made up as follows:			
				Fellows		28,449	
				Associates		822	
				Affiliated Societies		955	
				Student Members		12	
						30,238	

The Horticultural Society of New York—Lord Aberconway, the President of the Society, visited America in March in response to the invitation of the Council of the Horticultural Society of New York for a representative of the Royal Horticultural Society to visit the International Flower Show, March 17 to 22. In addition to this, the President visited and spoke at the Seventy-sixth Spring Flower Show of the Massachusetts Horticultural Society at Boston and at the Philadelphia Spring Flower Show. The various American Societies expressed themselves as being gratified that the Society should have been represented in America by its President.

Programme for 1947—The Chelsea Show was revived and held on May 21, 22 and 23. The Council is pleased to record that, despite the doubts which had been uttered in many quarters beforehand, the Show was a great success. Although in area it was only about two-thirds of the pre-war shows, nevertheless the standard of exhibits was as high

as ever and the Show was well attended, the numbers of visitors being comparable with those of pre-war years. Their Majesties the King and Queen, Her Majesty Queen Mary and other Members of the Royal Family graciously showed their continued interest in the Society's work by visiting the Show on the evening of May 20.

The Early Market Produce Show, which was projected for April 29 and 30, had to be cancelled in view of the lateness of the season. In its place the National Farmers' Union staged a co-operative exhibit of vegetables, fruit and flowers at the Chelsea Show. This exhibit attracted great attention and obtained the award of the Lawrence Medal.

The Horticultural Machinery Show, followed a fortnight later by a Demonstration at Wisley, was very successful, and the Council intends to repeat this at intervals in the future. A large range of implements was shown and demonstrated and proved useful in stimulating public interest in the possibilities of the mechanisation of the private garden or small-holding.

The Exhibition of Municipal Horticulture was held on September 9 and 10, being opened by Mr. John Edwards, M.P., Parliamentary Secretary to the Ministry of Health. The detailed administrative arrangements in connexion with this Exhibition were carried out by the Institute of Park Administration, assisted by a committee of this Society, on which the London County Council and other interested organisations were represented. The central feature of this Exhibition was carried out according to a plan submitted by Mr. R. I. Tilley, Superintendent of Parks, Harrow, who won the first prize offered by the Society in a Competition for a Design for the Central Feature of a Memorial Garden. The Exhibition could not have been held without the whole-hearted support given by a number of municipal authorities throughout the country, many of whom contributed materials and labour in order to ensure that the Exhibition was a success. The Council wishes to express its gratitude to all concerned for their assistance.

The Fortnightly Meeting, held on October 7 and 8, which included the Autumn Fruit and Vegetable Show, was again very successful and attracted large numbers of visitors to the halls.

Programme for 1948—The programme of Shows has been arranged for 1948 and was published in the Society's JOURNAL for November. It is substantially the same as that for last year, with the exception that the Council has decided to hold the Daffodil Show on April 13 and 14, between two of the ordinary Fortnightly Shows.

Garden Advisory Service—This service has again proved very popular and the time of the Garden Adviser has been completely taken up by it. It has been found necessary to inaugurate a small panel of experts in the more distant parts of the British Isles, who are willing to assist in this service. The gentlemen who are serving on this panel are all expert gardeners and, by acting for the Society in this manner, save the Society's Garden Adviser much time, thereby enabling many more visits to be undertaken than would otherwise have been possible.

Wisley: the Gardens—As may be expected, the Gardens suffered considerable losses during the severe winter, especially among tender shrubs such as species and hybrids of *Cistus*, *Helianthemum* and *Erica*.

The effects of the dry summer were mitigated by the improved watering equipment now available, and by the abnormal storm of July 16, when 4·25 inches of rain and hail fell in 1½ hours. This storm, however, did much temporary damage to paths and to herbaceous plants.

In the last Report the commencement of a number of new developments was mentioned. These have been carried a stage further and fresh schemes have been put in hand. The collection on Battleston Hill of *Rhododendron* species arranged in series has been planted and labelled; the majority of these were kindly presented by Mr. J. B. Stevenson, V.M.H., of Tower Court, Ascot. A "carpet" of Kurume Azaleas on the north slope of the Hill has also been planted, the lower portion consisting of E. H. Wilson's selected Fifty best varieties arranged in sequence. The latter were grown from cuttings kindly presented by Mr. C. Williams, of Caerhays Castle, and Mr. J. B. Stevenson. The beds of Roses north of the Floral Trials have been replaced by a bedding-out scheme, a type of horticulture not hitherto represented at Wisley. In the Wild Garden the lower branches of many trees have been removed to give more light and air, and large numbers of species of *Primula* and *Lilies* have been planted. A collection of *Hydrangeas* has been established on the banks of the stream at the entrance of the Pinetum, where further clearing of undergrowth has been carried out.

Three model fruit gardens suitable for amateur gardeners with limited space were planted this spring near the cordon pear collection.

The re-labelling of the principal plants in the Gardens has been put in hand, and a start has been made with the Award of Garden Merit Collection and the *Rhododendrons* on Battleston Hill.

A large group consisting chiefly of species of *Rhododendron*, *Primula* and *Meconopsis* was staged at the Chelsea Show in May.

The number of visitors to the Gardens again showed a considerable increase over that of the previous year.

The demonstrations held in the Gardens were well attended and will be repeated in 1948.

The Council wishes to express its thanks for the many generous donations of seeds and plants, both to the Gardens and for distribution to Fellows and for valuable gifts of books to the library by Mrs. F. R. Durham and Mr. E. G. Baker.

Housing—In common with all horticultural and agricultural undertakings, it has been found that the maintenance of sufficient labour is difficult without adequate accommodation. The Council has, therefore, decided to build a further seven cottages of modern design for the housing of its staff. The Surrey County Council has also been asked to provide cottages in the vicinity. It is not thought likely that these latter will be available at a very early date but, if and when all the new cottages are erected, the Society should be able to provide good housing accommodation for all its garden staff at Wisley.

Floral and Vegetable Trials.—The Floral Trials have included Bearded Iris, Border Carnations, Delphiniums, Dahlias, Dianthus, Early-flowering Chrysanthemums, Narcissus and Hybrid *Rhododendrons*; also Annual Larkspurs and Cornflowers. The Invited

Vegetable Trials comprised Celery, including the self-blanching varieties, Parsnips, Maincrop Peas, Runner Beans, Tomatoes in the open, and Vegetable Marrows. Besides these, the Society, as in previous years, undertook, at the request of the Ministry of Agriculture, a series of field Trials of vegetables from seed which had been imported by the Seeds Import Board. The Council desires to record its special thanks to Messrs. J. S. Cracknell, W. F. Giles, V.M.H., F. G. Potter and N. L. Tether, who acted as judges and advisers at these Trials. The Trials will be undertaken again during 1948 on behalf of the Seeds Import Board.

National Fruit Trials—The Trial of hardy fruits for commercial purposes, conducted by a Joint Committee of the Society and the Ministry of Agriculture and Fisheries, and the collection of fruit maintained in connexion with the Trials now occupies an area of approximately 44 acres. A considerable number of new varieties has been accepted for trial, while a larger number has been received for adding to the standard collections. The number of varieties represented in the trial grounds now exceeds 1,500. The number of visitors to the trial grounds has considerably increased and there has also been a greater number of organized parties. Samples of fruit of promising new varieties have been sent for preserving tests. The recording of the vegetative characters of all kinds of hardy fruits has been continued, as have also the investigations into the self-fertility or self-sterility of new varieties of Apples, Pears and Plums.

School of Horticulture—The training of ex-servicemen under the Ministry of Agriculture's Vocational Training Scheme has continued. Twenty-two men commenced their one-year course in April, and a further sixteen in October. A corresponding number of men completed their courses, seventeen gaining the Wisley Diploma. In addition fourteen student gardeners are taking two-year courses.

The practical examinations for the National Diploma in Horticulture and for the Certificate for Teachers of School Gardening were again carried out in the Gardens.

Advisory Work—The volume of inquiries continues to increase, about 43 per cent. being concerned with ornamental plants, 36 per cent. with fruit and 21 per cent. with vegetables.

Investigations—

1. *Entomology*—Entomological research was carried out on:—

- (a) The effect of chlorinated hydrocarbons (DDT, BHC, etc.) upon a wide range of horticultural pests.
- (b) The control of ants with poison baits and nest fumigants.
- (c) The effect of DDT vapour "smokes" on glasshouse pests.
- (d) The relation between canker of Parsnip and certain pests of this crop.
- (e) The control of soil pests, especially chafer and weevil grubs, with chlorinated hydrocarbons.
- (f) The thrips fauna of the flowers of hardy ornamental plants.

2. *Mycology*—

- (a) The trials of Antirrhinum stocks for their resistance to rust disease have been recommenced and seed selection is being carried out.
- (b) Tests on the use of various disinfectants for the control of club root are being continued.
- (c) An investigation into the causes of canker of Parsnip has been commenced.

3. *Cytology*—

- (a) The treatment with colchicine of a large number of ornamental trees, shrubs and herbaceous plants has been carried out with the object of producing improved forms due to the doubling of chromosomes.
- (b) A study of the relationship between cytology, classification and distribution is being made in a number of groups of garden plants, including Magnoliaceae, Morus, Asparagus, Sarracenia, Philadelphus and Rhododendron.
- (c) Hybridization work is being carried out in collaboration with the Curator.
- (d) Chromosome counts have been made in a number of horticultural plants.

White Fly Parasite—The distribution was continued, but a further reduction in the accommodation for breeding kept the supply below the demand. In future, the distribution of the parasites to Fellows will be discontinued owing to other urgent calls upon the Society's glasshouse space at Wisley, and supplies will not be available in 1948. The Ministry of Agriculture and Fisheries has been asked to organize alternative sources of supply.

The Groups—The Fruit, Lily and Rhododendron Groups continued to add to their membership during the year. The Fruit Group held discussions, a brains trust and two excursions, one to East Malling Research Station and another to the gardens of three amateur fruit growers. At most of the Shows members of the Group have exhibited examples of particularly well-grown fruits or of little-known but meritorious varieties. The Lily Group held two discussions and a brains trust, but owing to the unfavourable season abandoned its proposed visit to Wisley to see the Lilies there.

Deputation to Southport Show.—A Deputation from the Society, consisting of Mr. G. W. Leak, V.M.H., Mr. A. Cheal and Mr. W. R. Oldham, V.M.H., accompanied by the Deputy Secretary, visited the Southport Flower Show in August. The Deputation made several awards on behalf of the Society.

Examinations—There was an increase in the number of entries for the Society's examinations in 1947—1,590 as against 1,247 in 1946. Certificates were awarded to 111 candidates in the General Examination in Horticulture for Juniors, and to 411 in the General Examination in Horticulture; 14 certificates were awarded in the Final Examination for Teachers of School Gardening, and 68 candidates passed the Preliminary Examination; 22 diplomas were awarded in the Final

Examination for the National Diploma in Horticulture, and 34 candidates passed the Preliminary Examination. In the Examination for the National Diploma in Horticulture with Honours three candidates have been awarded the N.D.H. (Hons.).

The Examination for the National Certificate in Elementary Horticultural Practice, which was in abeyance during the war years, was revived in 1947, and 70 certificates were awarded to successful candidates.

Frost Damage—The winter of 1946–7 has been so severe that the Council thought that the opportunity should be taken to conduct a survey of the damage done to plants by the frost in order to determine their hardiness. A questionnaire was drawn up and circulated to the owners of some nine hundred gardens. The replies to this questionnaire have been carefully and accurately compiled. The Council is very grateful to all those who have been so good as to fill up and return the forms. The answers are being studied, and it is hoped to issue a report on the subject during 1948.

Fellows will remember that similar reports were prepared after the severe frosts of 1908–9 and 1916–17 and printed in the JOURNALS of 1910 and 1918.

Scholarships—The Worshipful Company of Gardeners have very generously offered to resume their contribution towards the Bursary and Scholarship of the Worshipful Company of Gardeners augmented by the revenues of the Sir James Knott Fund and a contribution from the Royal Horticultural Society. This Scholarship will normally be tenable for three years and will be awarded to promising young gardeners to enable them to carry out the equivalent of a “post graduate” course and to study horticulture both at Wisley and other establishments at home and abroad. The two previous holders of the Scholarship who received it before the war are now well known in horticultural circles, and we can hope that future scholars will likewise earn distinction in the horticultural profession.

Lindley Library—During the past twelve months the Library has been visited by over 1,300 persons, and 1,900 books have been lent; 256 books and major pamphlets have been added to the Library, in addition to current issues of periodicals.

Publications.—The Society’s publications have been continued. Work is proceeding on the *monograph of Anemones* by E. A. Bowles and W. T. Stearn, on the *monograph of Snowdrops* by Colonel F. C. Stern and E. A. Bowles, and on the *monograph of Sorbus* by Dr. J. Hutchinson. It is hoped that these may be ready to go to press during the next year. The *Botanical Magazine*, which is among the most important of the Society’s publications, is now being produced by means of a colour printing process in order to ensure more regular publication and to increase the circulation of this valuable scientific periodical. The cost of the new process is higher than the one used in the past, and the Council hopes that many Fellows and others will become new subscribers in order to make the magazine more nearly self-supporting. Fellows will find the magazine of great value and

interest, as it contains descriptions and representations of outstanding plants.

In addition to the *Rhododendron Year Book* a *Rhododendron Handbook* has been published. This contains lists of *Rhododendron* species and hybrids and other material formerly published in the *Year Book* of the *Rhododendron Association*. A *Fruit Year Book* has been published for the first time, and the publication of the *Daffodil and Tulip Year Book* and the *Lily Year Book* has been continued. A second edition of the Society's *Horticultural Colour Chart* has been published. The *JOURNAL* has been slightly larger during 1947 and colour-plates have been added once a quarter. Owing to new paper restrictions, however, it does not seem likely that the increased size can be continued, and the *JOURNAL* may have to revert to the size obtaining during 1946. Several of the lectures and articles in the *JOURNAL* have been reprinted in pamphlet form and reprints of former pamphlets have been issued. The series of articles in the *JOURNAL* on Garden Work throughout the year by Mr. J. Wilson has been reprinted as a pamphlet and a new impression of *The Vegetable Garden Displayed* is in progress. *A Guide to Wisley Gardens* will soon be issued. Good progress has been made with the Society's Dictionary of Gardening, but no date for publication can yet be announced. Work is proceeding also on the *ten-year Index* to the *JOURNAL*, 1936-45, and on the Index to the *Botanical Magazine* from its commencement in 1787 to the end of 1937. Owing to a variety of causes, progress on the preparation of *The Fruit Garden Displayed* has not yet been as rapid as had been hoped, and it is still impossible to give a date for publication.

The late Lt.-Col. F. R. Durham—The Council reports, with great regret, that Lt.-Col. F. R. Durham, C.B.E., M.C., the late Secretary of the Society, passed away on March 30. It is sad to think that he was not spared longer to enjoy the leisure which he had so richly earned.

Obituary—It is with deep regret that there has to be recorded the death of a number of distinguished horticulturists; of the holders of the Victoria Medal of Honour: Mr. W. J. Bean, Mr. C. R. Fielder, Dr. P. L. Giuseppi, President of the Alpine Garden Society, Mr. C. F. Langdon, Mr. W. W. Pettigrew and Mr. C. R. Scrase-Dickins; of the Honorary Fellows of the Society: Professor E. A. J. de Wildeman, the well-known Belgian botanist, and Mr. G. Lockie; of the Associates of Honour: Mr. T. H. Cook, Mr. J. J. Davidson, Mr. E. P. Long and Mr. J. Prior. Mention must also be made of General Sir John Du Cane, a former Member of Council; Sir Albert Howard; Dr. C. C. Hurst, Member of the Scientific Committee; Mr. Courtney Page, Honorary Secretary of the National Rose Society; Mr. T. H. Barnett, Member of the Fruit and Vegetable Committee; Capt. H. G. Hawker, Member of the Narcissus and Tulip Committee; Miss Hinchliff, an amateur exhibitor of Daffodils; Mr. A. Bruce Jackson, Member of the Scientific Committee; Miss L. F. Pesel, Member of the Joint Iris Committee; Dr. W. A. Propert, Member of the Picture Committee; and Mr. E. K. Wilson, Member of the Orchid Committee.

The Victoria Medal of Honour—The Victoria Medal of Honour has been awarded to Mr. W. Clark, Superintendent of the public parks,

gardens and open spaces of Southport and Show Ground Manager of the Southport Flower Show; to Mr. J. S. W. Cracknell, an outstanding authority on vegetables; to Dr. P. L. Giuseppi, an exceptionally successful cultivator and an indefatigable collector of alpine plants, who has unfortunately since died; to Mr. W. J. Mitchell, who has for many years been in charge of the famous arboretum at Westonbirt; and to Mr. A. Simmonds, Deputy Secretary of the Society.

Associates of Honour—The Associateship of Honour has been conferred on Mr. A. C. Bartlett, of the *Gardeners' Chronicle* staff; on Mr. F. G. Cousins, late Superintendent of Parks, Torquay; on Mr. J. Kneller, late Head Gardener at Penrhyn Castle Gardens; and on Mr. J. Wilson, the Society's Garden Adviser.

The Veitch Memorial Medals—Awards have been made as follows: a Gold Medal to Mr. F. J. Chittenden, F.L.S., V.M.H., for his outstanding services to horticulture, horticultural education and literature; and a Gold Medal to Major L. W. Johnston, for his work in connexion with the introduction and cultivation of new plants and for the taste and skill that he has exercised in garden design.

The Lawrence Medal—The Lawrence Medal has been awarded to the National Farmers' Union for a co-operative display of vegetables, fruit and flowers shown at Chelsea on May 21, 1947, which was considered to be the best exhibit shown to the Society during the year.

The Holford Medal—The Holford Medal has been awarded to Mr. Guy P. Harben for *Cymbidiums* shown on April 1, 1947, which was considered to be the best exhibit of plants and/or flowers shown by an amateur during the year in the Society's Halls.

The Sander Medal—The Sander Medal has been awarded to Major E. de Rothschild for *Nerine* 'Lionel' shown on November 4, 1947, which was considered to be the best new greenhouse plant of general utility shown to the Society during the year.

The George Moore Medal—The George Moore Medal has been awarded to N. M. Jensen for *Cypripedium* 'Banchory' 'Duke's Edge' variety shown on January 14, 1947, which was considered to be the best new *Cypripedium* shown to the Society during the year.

The Williams Memorial Medals—The Williams Memorial Medals have been awarded to Messrs. Robert Bolton & Son for their exhibit of Sweet Peas shown at Chelsea on May 21, 1947, and to Messrs. Konynenburg & Mark for their exhibit of *Gladioli* shown on August 12, 1947, which were considered to be the best groups of plants and/or cut blooms of one genus showing excellence in cultivation.

The Reginald Cory Memorial Cup—The Reginald Cory Memorial Cup for the raiser of the best new hardy hybrid of garden origin shown to the Society in the course of the year has been awarded to Lord Aberconway for *Viburnum bodnantense* shown on December 2.

Gifts to the Society—During the year Mrs. A. M. Sewell has presented to the Society the sum of £500 to establish a prize fund in commemoration of her husband, the late Dr. Henry George Sewell, who was a keen amateur gardener and for many years a Fellow of the Society. The fund, which will be known as the Henry George Sewell Prize Fund, will be used to provide prizes over a period of years

for the encouragement of the cultivation by amateurs of various outdoor flowers. Through the generosity of the family and friends of the late Mr. A. A. McBean the Council has also been able to establish a McBean Memorial Fund of £250 for the encouragement of the cultivation of Cymbidiums. Mr. McBean's fine exhibits of these plants, which he did so much to improve, will long be remembered. The fund will be used to provide a series of trophies to be offered for award over a period of years for exhibits of Cymbidiums staged by amateurs. The Council desires to place on record its appreciation of these generous gifts.

The Council also wishes to express its gratitude to the Society's Fellows and friends for gifts of plants and seeds, and for valuable contributions to the Library; and, in particular, they wish to express their thanks to Mrs. Helen Kenyon, the daughter of Mr. Thomas Statter, a former Member of Council, for a collection of seventy water colours of Orchids which had been executed for her father by J. L. MacFarlane. The Council is also deeply indebted to Mr. J. B. Stevenson, Major E. de Rothschild, Mr. Charles Williams and Sir John Ramsden for gifts of many valuable plants. These plants have been installed in their new quarters at Wisley and are of the utmost value towards completing the Society's collections.

The Council—The Council wishes to express its gratitude to the retiring members, Dr. R. G. Hatton, C.B.E., F.R.S., V.M.H., and Mr. T. Hay, C.V.O., V.M.H., both of whom have rendered most valuable service to the Society. The Council is glad to report that they have both kindly consented to continue to serve on the various committees of which they are members and their advice will still be available to the Society.

The Press—The Council records its appreciation of the support and help which has been so freely given to the Society by the members of the Press.

Committees, Judges, Examiners and Lecturers—The Council is deeply appreciative of the services rendered to the Society by the many members of various committees, the judges, the examiners and the lecturers, all of whom have given much time and thought, and without stint, to the affairs of the Society. The work of the Society could not have been carried on without the help of the numerous Fellows who have given their time and services in this manner.

Staff—The Council desires to express to the Society's Secretary and his staff at Vincent Square, and to the Director and his staff at Wisley, its deep appreciation of their loyal and valuable work during the past year.

Signed on behalf of the Council,

ABERCONWAY,
President.

December 31, 1947.

**ACCOUNTS
AND
BALANCE SHEETS**

Dr.

ANNUAL REVENUE & EXPENDITURE ACCOUNT

			£	s.	d.	£	s.	d.
1946	To LONDON—							
6	ESTABLISHMENT EXPENSES LESS ALLOCATIONS—							
3,733	Rent, Rates and Taxes		4,544	9	11			
11,935	Salaries, Wages & Gratuities to Retiring Staff		10,694	14	4			
	Other Establishment Expenses, including							
	Light, Fuel, Stationery, Professional Fees,							
	and Renewals		9,212	9	2			
5,816						24,451	13	5
21,484								
	„ WISLEY—							
	Net Expenditure for Year, as per separate							
21,182	Account					25,786	1	7
	„ PRINTING AND POSTAGE OF PUBLICATIONS—							
9,092	Journal		13,945	17	0			
		£ s. d.						
1,429	Other Publications	6,849	11	7				
	Less Legacies applied towards							
	the cost of "A Study of the							
	Genus Paeonia"	1,000	0	0				
			5,849	11	7			
10,521			19,795	8	7			
4,368	Less Sales and Advertisements		7,854	16	10			
6,153						11,940	11	9
1,312	„ STAFF PENSIONS		2,210	10	0			
583	Less Contributions by Staff as per Scheme		1,148	12	2			
729						1,061	17	10
	„ MEETINGS—							
	Expenses, Labour and Overheads of Special							
	and other Meetings		23,973	10	7			
5,182	Less Receipts		22,117	12	2			
2,692						1,855	18	5
192	„ CUPS AND MEDALS					403	4	5
	„ CONTRIBUTIONS TO LINDLEY LIBRARY, as per							
	Trust Account—							
	Purchase of Books		354	6	2			
223	Salaries, etc.		845	5	1			
509						1,199	11	3
732								
	„ SPECIAL EXPENDITURE—							
	Donation—Gardeners' Royal Benevolent Inst.		52	10	0			
	„ Royal Gardeners' Orphan Fund		21	0	0			
	„ British Colour Council		5	5	0			
	„ Royal Geographical Society		10	0	0			
	„ Roads Beautifying Assoc.		50	0	0			
	„ Agricultural Disaster Fund		105	0	0			
	Expeditions—Mr. Kingdon-Ward (Assam)		21	0	0			
	Mr. F. Davis (Turkey)		20	0	0			
190						284	15	0
540	„ BOTANICAL MAGAZINE					913	8	9
	„ EXAMINATIONS IN HORTICULTURE—							
	Expenses		1,811	15	11			
1,201	Less Fees		1,604	9	4			
887						207	6	7
314								
-	GENERAL SCHOLARSHIPS (not awarded)					-	-	-
	„ OLD AND NEW HALLS SINKING FUND APPROPRIATION					3,366	0	0
3,366								
	„ RESTAURANTS—							
	Expenses, including Proportion of Overheads,							
	less Receipts					182	17	9
826								
6,000	„ PROVISION FOR DEFERRED REPAIRS					6,000	0	0
	„ BALANCE, being Excess of Revenue over Ex-							
	penditure, added to General Reserve					10,851	11	10
10,977								
£75,377						£88,504	17	9

FOR THE YEAR ENDED 31st DECEMBER, 1947

Cr.

1946		£	s.	d.	£	s.	d.
62,198	By ANNUAL SUBSCRIPTIONS AND DONATIONS	.	.	.	69,788	11	1
2,122	„ DIVIDENDS AND INTEREST	.	.	.	2,460	0	6
43	„ Do. Do. DAVIS TRUST	.	.	.	42	5	1
82	„ DEPOSIT INTEREST	.	.	.	147	0	6
2,247					2,649	6	1
10,063	„ HALL LETTINGS, GROSS	.	.	.	15,331	12	8
	„ LIFE COMPOSITIONS— Being amounts transferred in respect of Life Fellows who have died during the year	.	.	.	401	12	6
376	„ RENT OF FREEHOLD PROPERTY (Wisley)	.	.	.	333	15	5

£75,377

£88,504 17 9

ROYAL HORTICULTURAL SOCIETY-

1946		LIABILITIES.				
£	£		£	s. d.	£	s. d.
	250,000	ACCUMULATED FUNDS ACCOUNT.			250,000	0 0
25,058		LIFE COMPOSITIONS as at 31st December, 1946	28,368	7 0		
		Less Amount transferred to Revenue in respect of Life Fellows who have died during the year	401	12 6		
493						
24,565			27,966	14 6		
3,803		Add Life Compositions received during the year	1,630	15 9		
	28,368				29,597	10 3
PROVISION FOR DEFERRED REPAIRS—						
		LONDON—Balance 31st December, 1946	6,000	0 0		
6,000		Add Transfer from Revenue & Expenditure	6,000	0 0		
					12,000	0 0
		WISLEY—Balance 31st December, 1946	3,000	0 0		
		Less Expended during year	1,766	0 0		
			1,234	0 0		
3,000		Add Transfer from Revenue & Expenditure	4,000	0 0		
					5,234	0 0
8,463		SUNDRY CREDITORS			13,605	5 4
2,327		SUBSCRIPTIONS IN ADVANCE			1,856	17 6
10,000		DEPRECIATION AND RENEWALS FUND			10,000	0 0
62,799		OLD AND NEW HALLS SINKING FUND	68,073	8 1		
62,799		Deducted <i>per contra</i>	68,073	8 1		
3,704		SHOWS CONTINGENCY FUND			3,805	18 7
1,000		Legacies				
		MONOGRAPH FUND—The Garsed Price Bequest			507	8 3
MEMORIAL AND OTHER TRUST FUNDS—						
		Balances of Income Accounts in the hands of the Society, as per Separate Schedule			474	2 2
GENERAL RESERVE—						
31,661		Balance as at 31st December, 1946	43,019	15 11		
382		Add Surplus on Realisation of Investments	260	10 9		
		War Damage Repairs, written off in previous years, now recovered	640	11 8		
		Balance of Revenue and Expenditure Account, 31st December, 1947	10,851	11 0		
10,977						
	43,020				54,772	9 4
	£356,649				£381,853	11 5

I have audited the above Balance Sheet, dated 31st December, 1947, and have obtained all the information and explanations I have required. In my opinion such Balance Sheet is properly drawn up so as to exhibit a true and correct view of the state of the Society's affairs according to the best of my information and the explanations given to me and as shown by the books of the Society.

F. G. FEATHER, F.C.A., Auditor.
(HARPER, FEATHER & PATERSON, Chartered Accountants),
4 Loyds Avenue, London, E.C. 3.

13th January, 1948.

BALANCE SHEET, 31st DECEMBER, 1947

1946		ASSETS	£	s.	d.	£	s.	d.
£	£							
77,648		OLD HALL, OFFICES, RESTAURANT, LIBRARY, AND EQUIPMENT AT COST	77,642	0	0			
167,706		NEW HALL, RESTAURANT AND EQUIPMENT AT COST	167,706	2	10			
245,348			245,348	2	10			
62,799		Less Old and New Halls Sinking Fund <i>per contra</i>	68,073	8	1			
<u>182,549</u>						177,274	14	9
		OLD AND NEW HALLS SINKING FUND INVESTMENTS AT COST—						
57,733		As at 31st December, 1946	62,798	13	11			
5,066		Additions during the year	5,274	14	2			
<u>62,799</u>						68,073	8	1
		(Market Value at 31st December, 1947, £68,527 15 6)						
		FREEHOLD PROPERTY, WISLEY—						
13,105		At Cost, less amounts written off				13,105	2	11
		BOTANICAL MAGAZINE—						
100		Stock				100	0	0
		DEPRECIATION AND RENEWALS FUND INVESTMENTS AT COST				10,000	0	0
10,000		(Market Value at 31st December, 1947, £10,204 7 7)						
		SHOWS CONTINGENCY FUND INVESTMENTS AT COST—						
3,608		As at 31st December, 1946	3,704	1	3			
96		Additions during the year	101	17	4			
<u>3,704</u>						3,805	18	7
		(Market Value at 31st December, 1947, £3,888 17 5)						
1,000		Legacy Investments—						
		MONOGRAPH FUND INVESTMENTS AT COST				507	8	3
		(Market Value at 31st December, 1947, £502 0 9)						
		GENERAL INVESTMENTS AT COST—						
48,401		As at 31st December, 1946	63,873	0	11			
15,382		Additions during the year	11,777	3	10			
<u>63,873</u>						75,650	4	9
		(Market Value at 31st December, 1947, £74,500 7 0)						
455		WISLEY ADJUSTMENT ACCOUNT				505	1	11
		R.H.S. DICTIONARY OF GARDENING—						
1,883		Expenditure to date (in suspense)				2,109	4	8
8,716		SUNDRY DEBTORS AND PAYMENTS IN ADVANCE				11,176	13	6
8,465		CASH AT BANK AND IN HAND				19,545	14	0
<u>£356,649</u>						<u>£381,853</u>	11	5

Dr.

WISLEY GARDENS—REVENUE & EXPENDITURE

1946 £	£		£ s. d.	£ s. d.
		To ESTABLISHMENT EXPENSES—		
1,898*		Salaries, Wages, and Gratuities to Retiring Staff	4,899 3 7	
562		Rates, Taxes and Insurances	754 9 9	
1,985		Miscellaneous, including Donations	2,170 8 6	
159		Annuities	140 19 4	
	8,604			7,965 1 2
		* Includes Redemption of Pension Rights		
		„ LABORATORY AND SCHOOL OF HORTICULTURE—		
3,437		Salaries and Wages	3,450 11 11	
106		Miscellaneous	169 9 11	
36		Depreciation	39 0 7	
	3,579			3,659 2 5
		„ GARDEN—		
8,651		Salaries and Wages	10,018 17 10	
333		Seed Distribution less Receipts	469 4 4	
2,486		Miscellaneous	3,354 13 6	
303		Depreciation	281 16 2	
	11,773			14,124 11 10
909		„ STAFF PENSIONS	1,044 5 4	
436		Less Contributions by Staff, as per Scheme	520 10 8	
	473			523 14 8
	£24,429			£26,272 10 1
		17,771 To BALANCE, brought down		£19,994 15 8
		„ SPECIAL EXPENDITURE—		
		Lorry and Motocart	828 17 6	
		Clearing Battleston Hill	612 8 5	
		Gantry for River Pump	350 0 0	
		Provision for Deferred Repairs	4,000 0 0	
	3,411			5,791 5 11
	£21,182			£25,786 1 7

ACCOUNT FOR THE YEAR ENDED 31st DECEMBER, 1947

Cr.

1946							
		£		s.		d.	
1,026	BY DIVIDENDS AND INTEREST					1,051	0 9
,, GARDEN—							
5,632	Sales and Miscellaneous Receipts	4,599	8	11			
	Grant from Ministry of Agriculture in respect of National Fruit Trials	627	4	9			
						5,226	13 8
17,771	„ BALANCE, carried down					19,994	15 8
£24,429						£26,272	10 1
	By BALANCE, being Net Expenditure for the Year, carried to the Annual Revenue and Expenditure Account					25,786	1 7
21,182							
£21,182						£25,786	1 7

WISLEY GARDENS—BALANCE

1946

LIABILITIES.

		£	s.	d.
£				
34,545	ACCUMULATED FUNDS ACCOUNT	34,545	10	0
455	VINCENT SQUARE ADJUSTMENT ACCOUNT	505	1	11
24,666	ENDOWMENT TRUST FUND	24,869	2	11
11,281	DEPRECIATION AND RENEWALS FUND	11,530	10	2

£70,947

£71,450 5 0

SHEET, 31st DECEMBER, 1947

1946		ASSETS.	£ s. d.	£ s. d.
£	£	LABORATORY, DWELLING HOUSES, GLASS HOUSES, RANGES, ETC., AT COST . . .		33,371 10 10
	33,372	N.B.—The Hanbury Trust Estate is, under the Trust Deed, vested in the Society only so long as it is in a position to use it as an Experimental Garden. Accordingly the Expenditure thereon by the Society is an Asset only so long as the Gardens continue to be used by the Society.		
	242	FUEL STOCK (valued by the Director) . . .		305 0 0
		PLANT AND LOOSE EFFECTS (valued by the Director)—		
1,420		As at 31st December, 1946	1,386 8 5	
55		Add Purchases during the year	58 9 5	
				1,444 17 10
1,475		Less Depreciation of Garden and Laboratory Effects	70 16 9	
89				1,374
—	1,386			
		ENDOWMENT TRUST FUND INVESTMENTS AT COST		
24,666		As at 31st December, 1946	24,666 3 11	
		Profit on Redemption of Investment	202 19 0	
				24,869 2 11
		(Market Value at 31st December, 1947, £26,054 18 1)		
		DEPRECIATION AND RENEWALS FUND INVESTMENTS AT COST—		
11,031		As at 31st December, 1946	11,280 10 2	
250		Additions during the year	250 0 0	
—	11,281			11,530 10 2
		(Market Value at 31st December, 1947, £12,721 15 9)		
	£70,947			£71,450 5 0

I have audited the books from which the foregoing Accounts are compiled, and certify that they exhibit a true and correct statement of the position on the 31st December, 1947. In the total of Assets, £71,450 5s. 0d., are included Investments, amounting to £36,399 13s. 1d., representing Endowment and Depreciation Funds which are not available for the general purposes of the Society.

F. G. FEATHER, F.C.A., Auditor.

(HARPER, FEATHER & PATERSON, Chartered Accountants),

4 Lloyds Avenue, London, E.C. 3.

13th January, 1948.

21 APR 1948

Extracts from
THE PROCEEDINGS OF
THE ROYAL HORTICULTURAL SOCIETY

GENERAL MEETINGS

NOVEMBER 4, 1947

SCIENTIFIC COMMITTEE—Mr. E. A. BOWLES, M.A., F.L.S., F.R.E.S., V.M.H., in the Chair, and four other members present.

Vaccinium.—A *Vaccinium* in fruit sent for naming by Mrs. F. Stoker was referred to Dr. W. B. Turrill for identification.

Rose Fruit.—Mr. E. A. Bowles showed fruits of the climbing rose 'Cupid'; these were orange, pear-shaped, about 3 cm. long, 2.5 cm. wide.

Viburnums in Fruit.—Mr. Bowles also showed fruiting specimens of the wild British *Viburnum Opulus*, having red fruits, the amber-fruited var. *fructu luteo* and an intermediate brick-red form, as well as the closely allied American species *V. Sargentii*.

FRUIT AND VEGETABLE COMMITTEE—Mr. F. A. SECRETT, C.B.E., in the Chair, and twelve other members present.

Awards Recommended :

Gold Medal

To the Governors of St. Andrew's Hospital, Northampton, for a group of vegetables. (Votes 10 for, 0 against.)

Silver-gilt Hogg Medal

To H. H. Crane, Esq., Highmead, Cheney Lane, Eastcote, Pinner, Middlesex, for a group of Apples.

Other Exhibits

Seedling Apple from Messrs. S. Aish & Son, Cissbury Nurseries, Borough Road, Dunstable, Beds.

Seedling Apple from Mrs. E. Atkins, Corbiere, 1 Tennyson Road, Stoke, Coventry, Warwickshire.

FLORAL COMMITTEE A—Mr. G. W. LEAK, V.M.H., in the Chair, and fourteen other members present.

Awards Recommended :

Gold Medal

To Messrs. Allwood Bros., Ltd., Haywards Heath, for an exhibit of Carnations.

Silver-gilt Flora Medal

To Messrs. A. G. Vinten, Ltd., Balcombe, for an exhibit of Chrysanthemums.

To Messrs. Bakers Nurseries, Ltd., Codsall, for an exhibit of New Otley and New Windsor Chrysanthemums.

To Messrs. Dando & Dark, Midsomer Norton, for an exhibit of Cyclamen.

To Messrs. C. Engelmann, Ltd., Saffron Walden, for an exhibit of Carnations.

To Major Edmund de Rothschild (gr. Mr. B. Hendy), Exbury, for an exhibit of Nerines.

To World's End Nurseries, Wendover, for an exhibit of Cyclamen.

Silver Banksian Medal

To Messrs. Blackmore & Langdon, Bath, for an exhibit of Korean Chrysanthemums and Cyclamen.

To Messrs. Napier, Taunton, for an exhibit of Carnations.

Flora Medal

To Messrs. Biddlecombe Bros., Bracknell, for an exhibit of Carnations.

To the Borough of Malden and Coombe, New Malden, for an exhibit of Chrysanthemums.

Banksian Medal

To Messrs. R. Gill & Son, Penryn, for an exhibit of Anemones and Violets.

To the Orpington Nurseries Co., Ltd., Orpington, for an exhibit of Korean Chrysanthemums.

Award of Merit

To *Nerine 'Caryatid,'* as a cool greenhouse flowering plant (votes 14 for, 0 against), from Major Edmund de Rothschild (gr. Mr. B. Hendy), Exbury. (See p. 28.)

To *Nerine 'Falaiae,'* as a cool greenhouse flowering plant (votes 11 for, 2 against), from Major Edmund de Rothschild, Exbury. (See p. 28.)

To *Nerine 'Lionel,'* as a cool greenhouse flowering plant (votes 14 for, 0 against), from Major Edmund de Rothschild, Exbury. (See p. 28.)

Other Exhibits

Chrysanthemum 'Regal,' from Messrs. J. & E. Maher, Hampton.

Chrysanthemum 'Sso-Kayen,' from E. T. P. Goodyear, Esq., Reigate Heath.

FLORAL COMMITTEE B—Lord ABERCONWAY, C.B.E., V.M.H., in the Chair, and fourteen other members present.

Awards Recommended :*Banksian Medal*

To the Kew Topiary Nurseries, Richmond, for an exhibit of clipped Box trees.

To Mr. Stephen Sims, Draycott, for an exhibit of conifers.

To Mr. F. Street, Woking, for an exhibit of conifers.

Award of Merit

To *Berberis Jamesiana 'East Lodge' Variety,* as a hardy, ornamental-fruited shrub (votes unanimous), from W. B. Cranfield, Esq., F.L.S., V.M.H., East Lodge, Enfield Chase. (See p. 25.)

To *Polypodium vulgare pulcherrimum,* May's Form, as a hardy fern (votes 9 for, 1 against), from W. B. Cranfield, Esq. (See p. 28.)

Other Exhibits

Decaisnea Fargesii (fruiting), exhibited by W. Bentley, Esq., Newbury.

Gentians, exhibited by Mr. Newberry, Knebworth.

Polypodium vulgare Hadwini var., *Polystichum angulare divisilobum* (Bland), exhibited by W. B. Cranfield, Esq.

Rock Garden plants, exhibited by the Orchard Neville Nurseries, Baltonsborough.

Window-boxes, exhibited by the Dayspring Nurseries, Ripley, Surrey.

ORCHID COMMITTEE—Mr. GURNEY WILSON, F.L.S., V.M.H., in the Chair, and thirteen other members present.

Awards Recommended :*Silver-gilt Banksian Medal*

To Messrs. Sanders, St. Albans, for a group of Orchids.

Silver Banksian Medal

To Messrs. Charlesworth & Co., Haywards Heath, for a group of Orchids.

Award of Merit

To *Sophrocattleya 'Peach Blossom' (S. grandiflora × C. 'Remy Chollet')* (votes 10 for, 2 against), from Messrs. Sanders, St. Albans. (See p. 49.)

Cultural Commendation

To Messrs. Vacherot-Lecoufle, Boissy St. Léger, France, for well-cultivated plants of *Vanda coerulea*, which had been raised from seed in France.

Other Exhibits

Laeliocattleya 'Trivesias' (Lc. 'Trivanhoe' × Lc. 'Tiresias') with an erect spike of several well-formed flowers.

Laeliocattleya 'Danae,' from Messrs. Vacherot-Lecoufle, Boissy St. Léger, France.

Brassolaeliocattleya 'Midenette' var. 'Golden Dawn,' from Messrs. Charlesworth & Co., Haywards Heath.

JOINT PERPETUAL FLOWERING CARNATION COMMITTEE—Mr. GEORGE MUNRO, V.M.H., in the Chair, and seven other members present.

Exhibits

'Market Rose' to be seen again, as a market variety, shown by Messrs. Allwood, Bros., Wivelsfield Nurseries, Haywards Heath, Sussex.

'Binfield Scarlet,' shown by Messrs. Biddlecombe Bros., Moss End Nurseries, Bracknell, Berks.

DECEMBER 2, 1947

SCIENTIFIC COMMITTEE—Mr. E. A. BOWLES, M.A., F.L.S., F.R.E.S., V.M.H., in the Chair, and four other members present.

Timber Insect—Mr. G. Fox Wilson showed a specimen of an insect *Acanthocinus aedilis* L, the "Timberman", which had come to notice during repairs to a cottage at Kirby-in-Ashfield, Yorkshire, having presumably been imported with foreign timber; it has remarkably long antennæ.

Poncirus Fruit—Mr. E. A. Bowles showed an unusual, twinned fruit of the hardy orange, *Poncirus trifoliata* (L.) Raf., often known as *Aegle sepiaria* D.C.

Cultivated Alchemillas—Mr. W. T. Stearn showed specimens of *Alchemilla* grown in the Kew and Cambridge Botanic Gardens, which had been identified by the German *Alchemilla*-specialist Werner Rothmaler, and commented on the part played by apomixis in this genus, whereby minutely differentiated forms remain constantly distinct and spread over wide areas. The specimens exhibited included *A. sericata* Rchb. ex Buser, *A. rigida* Buser, *A. conjuncta* Babington, *A. subsericea* Reuter, *A. asterophylla* (Tausch) Buser, *A. speciosa* Buser and *A. mollis* (Buser) Rothmaler. Of these only three had any garden value, *A. conjuncta* primarily for its neat foliage silvered beneath, *A. speciosa* and *A. mollis* for their large inflorescences of greenish yellow flowers as well as for their softly hairy foliage. *A. speciosa* had been known in gardens since about 1890 but was not recorded in a truly wild state until 1938; it is a native of the Caucasus. *A. mollis* was introduced from Asia Minor in 1874. No horticultural reference books describe these plants which are widespread in gardens.

FRUIT AND VEGETABLE COMMITTEE—Mr. F. A. SECRETT, C.B.E., in the Chair, and seventeen other members present.

Awards Recommended :

Silver Hogg Medal

To the Principal, Waterperry Horticultural School, Wheatley, Oxford, for a group of Apples.

The following Awards were recommended after Trial at Wisley:

Award of Merit

To Celery 'Clandon White,' sent by Messrs. Watkins & Simpson, Ltd., 27 Drury Lane, Covent Garden, W.C. 2.

To Celery 'Cluseed Special Market White,' sent by Messrs. J. L. Clucas, Ltd., Ormskirk, Lancs.

To Celery 'Cluseed Monarch White,' sent by Messrs. J. L. Clucas, Ltd., Ormskirk, Lancs.

To Celery 'Clayworth Prize Pink,' sent by Messrs. Nutting & Sons, Ltd., Warwick Wold, Merstham, Surrey.

To Celery 'Standard Bearer Red,' sent by Messrs. Watkins & Simpson, Ltd., 27 Drury Lane, Covent Garden, London, W.C. 2.

Highly Commended

To Celery 'Bibby's Defiance White,' sent by Messrs. Watkins & Simpson, Ltd., 27 Drury Lane, Covent Garden, London, W.C. 2.

To Celery 'White Perfection,' sent by Messrs. Watkins & Simpson, Ltd., 27 Drury Lane, Covent Garden, London, W.C. 2.

To Celery 'Clayworth Prize Pink,' sent by Messrs. Watkins & Simpson, Ltd., 27 Drury Lane, Covent Garden, London, W.C. 2.

First Class Certificate

To Parsnip 'Smooth White,' sent by The Ferry-Morse Seed Co., San Francisco, California, U.S.A.

Award of Merit

To Parsnip 'Offenham,' sent by Messrs. Elsoms (Spalding), Ltd., Spalding, Lincs.

Highly Commended

To Parsnip 'Yates' Eveham,' sent by Messrs. Yates & Son (Seeds), Ltd., Evesham.

To Parsnip 'Lisbonnais Selected,' sent by Messrs. G. A. Bunting & Co., 3-9 Bucknall Street, New Oxford Street, London, W.C. 2.

To Parsnip 'Sutton's Tender and True,' sent by Messrs. Sutton & Sons, Ltd., Seedsmen, Reading.

Other Exhibits

Group of Apples and Apple Rootstock, from the Director, East Malling Research Station, nr. Maidstone.

Group of Apples, from the Director, John Innes Horticultural Institution, Merton Park, S.W. 19.

Group of Celery and Parsnips, from The Director, R.H.S. Gardens, Wisley.

Seedling Apple, from W. J. Wadey, Esq., 1 Station Avenue, Caterham.

Seedling Apple, from P. G. Staines, Esq., Wyche School House, Malvern, Worcs.

Apples 'Mère de Ménage,' 'Sure Crop,' and 'Lane's Prince Albert,' from F. H. Wallen, Esq., Hermitage Lodge, Holmes Chapel, Cheshire.

Supposed mutation, from 'Allington Pippin,' from W. J. Widgery, Esq., 40 Court Farm Avenue, Ewell, Surrey.

Apple 'Merton Pippin,' from the Director, John Innes Horticultural Institution, Merton Park, S.W. 19.

Apple 'Mareda' and Seedling Apple, from A.'C. Nash, Esq., Scutes Farm, Elphinstone Road, Hastings.

Seedling Apple, from H. M. Johnston, Esq., Hon. Sec., Hampreston Parish Horticultural Association, Clements, Ferndown, Dorset.

Apple 'Constable's Seedling,' from W. J. Constable, Esq., Little Moseley Farm, Naphill, High Wycombe, Bucks.

Apple 'Margaret's Favourite' (previously shown as 'Godden's Russet'), from Mr. F. B. Longly, London Road, Nurseries Hythe, Kent.

Seedling Apple, from Messrs. Golden Bros., Mundham House, nr. Loddon, Norwich, Norfolk.

Seedling Apple from, Miles Shepherd, Esq., 19 Chalford Oaks, Acklam, Middlesbrough.

Apples 'Crimson Cox' and 'Bowden's Seedling,' and Pear 'Josephine de Malines,' from The National Fruit Trials, Wisley.

FLORAL COMMITTEE A—Mr. G. W. LEAK, V.M.H., in the Chair, and fifteen other members present.

Awards Recommended :*Gold Medal*

To Messrs. Blackmore & Langdon, Bath, for an exhibit of Cyclamen.

Silver-gilt Floral Medal

To Messrs. A. G. Vinten, Ltd., Balcombe, for an exhibit of Chrysanthemums.

Silver-gilt Banksian Medal

To Mr. H. Woolman, Birmingham, for an exhibit of Chrysanthemums.

Silver Flora Medal

To Mr. H. C. Crone, London, for an exhibit of Cyclamen.

To Messrs. Dando & Dark, Midsomer Norton, for an exhibit of Cyclamen.

To the Golden Valley Nurseries, Brimscombe, for an exhibit of Cyclamen.

To Messrs. Greenyer Bros., Ltd., Worthing, for an exhibit of Chrysanthemums.

To Mr. Stuart Ogg, Swanley, for an exhibit of Chrysanthemums.

To Messrs. T. Rochford & Son, Broxbourne, for an exhibit of Cyclamen.

To A. D. Sanderson, Esq. (gr. Mr. J. Prior), Sanderstead, for an exhibit of Begonias.

Silver Banksian Medal

To Messrs. Allwood Bros., Ltd., Haywards Heath, for an exhibit of Carnations.

To Messrs. Keith Luxford & Co., Sawbridgeworth, for an exhibit of Chrysanthemums.

Flora Medal

To Messrs. Napier, Taunton, for an exhibit of Carnations and Chrysanthemums.

Banksian Medal

To Monkswood Nurseries, Ltd., Monkswood, for an exhibit of 'Regal Favourite' Chrysanthemums.

Cultural Commendation

To Mr. S. M. Gault, St. Andrew's Hospital Gardens, Northampton, for plants of a very well fruited selected form of *Solanum Capsicastrum*.

Selected for trial at Wisley

Solanum Capsicastrum 'selected form', from the Governors of St. Andrew's Hospital, Northampton.

Other Exhibit

Chrysanthemum sport, from Messrs. H. Butterworth & Sons, Mytholmroyd.

Chrysanthemum 'Lilias Rider Haggard,' from Messrs. E. Walpole & Son, Broome.

Chrysanthemums, Violets, Anemones, etc., from Mr. Stephen Sims, Draycott.

Gazanias, from Mr. R. D. Lainson, Piltown.

PATRONS, COUNCIL AND OFFICERS, 1948.

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HER MOST GRACIOUS MAJESTY QUEEN MARY
H R H THE PRINCESS ROYAL.

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W. B. TURRILL, D.Sc., F.L.S.

EDITOR OF "R.H.S. DICTIONARY OF GARDENING"

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AUDITOR : F. G. FEATHER, F.C.A. (Messrs. HARPER, FEATHER & PATERSON, Chartered Accountants).

BANKERS : WESTMINSTER BANK, LIMITED (Victoria Branch)

SOLICITORS : MESSRS. GARRARD, WOLFE & COMPANY

Extracts from
**THE PROCEEDINGS OF
THE ROYAL HORTICULTURAL SOCIETY**

ANNUAL GENERAL MEETING

FEBRUARY 17, 1948

REPORT OF PROCEEDINGS of the ONE HUNDRED AND FORTY-FOURTH ANNUAL GENERAL MEETING, held in The Hall, Greycoat Street, Westminster, on Tuesday, February 17, 1948.

Lord ABERCONWAY, C.B.E., V.M.H., President, in the Chair, with Members of Council and over two hundred and fifty fellows.

The SECRETARY read the notice convening the Meeting and announced that the Minutes of the last Meeting had been circulated in the April number of the JOURNAL, 1947, Vol. 72, Part 4.

The CHAIRMAN : I move that the Minutes be taken as read, and I also move their adoption.

(The Meeting agreed unanimously and the Minutes were then signed by the Chairman.)

The CHAIRMAN : I now move that "the Report of the Council be approved and adopted." We will, with your permission, and as usual, take that as read. In it we may remark that the increase in the membership of the Society for the year up to November 4, 1947, was no fewer than 2,880 new Fellows, Associates, students and others. I do not know—I have never known—why the date of November 4 was taken, but at any rate that is usual, but since November 5—a very well-known date—the fellowship of the Society has gone up like the proverbial rocket, and we have had 1,111 more Fellows to add to our numbers. From that must be taken, of course, those who have retired at the end of the year 1947, and the deaths among Fellows which also are taken into our reckoning at the end of the year. Calculating those various sums out, we have a Fellowship to-day of 30,431 members, a very substantial amount indeed.

Somebody has suggested to me that one of the reasons for this increase in our Fellowship is that, with austerity living and the absence of basic petrol, there is little else to live for except Fellowship of the Royal Horticultural Society. (Laughter).

The great event of the year just passed has been the revival of the Chelsea Show; I hope it will mean a permanent revival of a Show which will grow in size and beauty and interest from year to year.

Chelsea Show did not attain quite its pre-war size, but then a work of art is not always measured by the superficial feet which it occupies; but I think it was as full of artistry—if I may use the word—and of interest as Shows that we have had before the war. The exhibitors thought they could not do it, but they rose to the occasion wonderfully,

and they did it. I think that those of us who were at the Show will think that our friends at Wisley gave a splendid lead to the other exhibitors. The Society was greatly honoured by a visit from Their Majesties, and other members of the Royal Family, who displayed the deepest and most friendly interest in the exhibits and in the exhibitors.

During the course of the year I paid a visit to America, at the invitation of the New York Horticultural Society, and as representing the Royal Horticultural Society. I saw three magnificent Shows, one at New York, one at Philadelphia, and one at Boston. I experienced the traditional hospitality of our American friends—and I brought back from them messages to you, the Fellows of the Royal Horticultural Society, and to other gardeners in this country, messages of most affectionate regard, and of their best wishes for our prosperity in all things. I came to the conclusion, as every Britisher who travels in America must do, that, although we sometimes criticise the Americans, and sometimes they, or their Press, say hard things about Great Britain, yet their friendship for us is very very real, and that their generosity to us is exceeding great. (Applause.)

When I was in America I came across the trail of a very interesting plant, it is called *Metasequoia glyptostroboides*. That is not a name devised by our botanical friends; I fancy it is a name devised by a fossil botanist, that is to say a botanist who specialises in plant fossils. It is a tree that grew perhaps a hundred million years ago, and which has been recently discovered living in China. We grow the *Wellingtonia* and *Sequoia sempervirens* in this country, and now we have this third one. The Americans having heard of it, our friends at the Arnold Arboretum sent an expedition to gather seeds. They said it cost them ten million Chinese dollars to organise the expedition, but fortunately owing to the vagaries of Chinese currency, it only set them back about 250 dollars. (Laughter.) They have been extremely generous with the produce, some are at Kew, some at Edinburgh, some are at Wisley, and they sent some to me. We hope that in due course our English gardens may bristle with that very interesting plant, in spite of its forbidding name.

You naturally want to know how Wisley is doing. It is very unfortunate that through the absence of basic petrol it is not easy to get to Wisley, but you can go down I believe on the Green bus, and possibly if you are lucky you may come across that conductor, who very shortly after January 1 said to a passenger who tendered his fare "None o' that, Mate, I am taking no fares, the bus belongs to you and me." (Laughter.) You may or may not meet that conductor, possibly he has now left the service. (Laughter.) But when you get to Wisley you will see striking changes. We have, under the skilled direction of Mr. Gilmour and Mr. Hanger, made very great progress with our work, because we have no fewer than 38 ex-Service students learning how to be good gardeners, and we have also another 14 young men who are taking up gardening as a profession. As a result we have been able to undertake improvements that have been long in contemplation as well as recently devised schemes for fresh plantings. Battleston Hill has been entirely re-organised, and the planting greatly improved, while for those who look on Rhododendrons with scorn and dislike—Battleston Hill is chiefly Rhodo-

dendrons—we have planted avenues of Cherry trees; and Fellows who live in chalk pits and places of that kind will be able to come at Cherry time to Wisley to see the flowering of our Cherries.

We are proceeding actively with research on various plant problems and diseases, but one of the most interesting types of research that we have been now conducting for some months is that on cytology, as it is called, that is the investigation of chromosomes. Usually a plant is a diploid, that is it has two sets of chromosomes in every cell, but some plants naturally develop four sets of chromosomes, when they are called tetraploids, or even a greater number of sets—they are always in sets—when they are called polyploids. Scientists have devised methods now, not of course alone at Wisley but at several stations in the world, for artificially increasing the number of chromosomes, making a diploid into a tetraploid or a polyploid. It is rather a difficult thing to do, it is especially difficult with shrubs, and we are only just beginning to succeed. You poison the plants. If I may use a homely illustration, if you have a row of gangsters that you are going to hang in the old-fashioned way, you pull some of them up and hang them a long time, and they are dead and done for. Others you let down fairly quickly and they go away unharmed and as great rascals as before; but if you hang them so long that you very nearly kill them but not quite, they may go away changed men. Similarly you poison say seedlings with colchicine, some are killed, some are unaffected, but if you are lucky, just one or two have their chromosomes doubled. I think it was Dr. Johnson who said, "You can teach a dog to walk on its hind legs like a man, but when you have done that will he be a better dog?" I think we can rightly ask those who are engaged on research into the doubling of chromosomes whether a plant will be a better plant when they have succeeded in doing this. I would say the evidence is strongly in favour of the plant being often a better plant. We have for many generations all over the world, selected the best form of wheat and oats and all those kind of crops to get a bigger yield per acre, and it has now been found on looking into the plants that have been selected that most of them are natural tetraploids or polyploids, and that having naturally doubled the chromosomes they are the best plants and give the best results. Colonel Stern tells me that research on Irises shows that many of the best new hybrids are from tetraploid or polyploid parents. I saw myself at the Arnold Arboretum an artificially made tetraploid Forsythia. It was just an ordinary Forsythia which had been treated and grown up into a plant; the flowers were very much deeper in colour than the ordinary Forsythia, and they were far more substantial, not just the little flimsy, papery flowers such as you generally see, while the leaves were larger and it was altogether a stronger plant.

We are trying these experiments now at Wisley with both flowers and fruit. It is too early to give results, but we have hopes that something may be accomplished. If you come to think of it, what a wonderful thing it would be if by applying this process to our food plants, we could increase their yield. We know that the world's population is increasing, especially in the Far East, while the means of subsistence leave a less and less margin. If scientists by employing this research

could secure that each acre of cultivated land grew a percentage more of an edible crop, that is going to be a very great advance towards preventing that universal shortage of food which eventually threatens us.

I am very glad indeed that Wisley is attacking this problem, even although it is just a tiny corner of the whole, because I think that, of all the branches of scientific research that is taking place, the ones that will be of most benefit to mankind are, first, medical research which is making such leaps and bounds; secondly, research on the industrial use of atomic energy—if indeed we do not quarrel with one another and blow ourselves up first (Laughter); and thirdly, this research on the chromosomes of plants. I think that we can congratulate our worker at Wisley on what she has done already in the few months during which she has been engaged in this research. (Applause.)

Our publications are again suffering from austerity. They are very much restricted by the shortage of supplies of paper and by the slowness with which things get into print, but the Index to the last ten years of the Royal Horticultural Society's JOURNAL is being published to-day, and that is a very valuable book of reference if you have kept the past issues of your JOURNAL, as probably most of you have done.

The *Dictionary of Gardening* is half of it now in type. The technical problems connected with the *Botanical Magazine* are I hope overcome, Before the end of next month it will be in the hands of subscribers, and we hope of many new subscribers, because with this new process we need, in order to make both ends meet a very much larger public who will take it.

You have four Year Books and one Handbook in your hands, dealing with subjects in which most of you are interested. Colonel Stern's book on *Paeonies* has now been published some months; it has received a very cordial welcome and has added greatly to the credit of your Society.

There is another activity which we are undertaking, that is searching for new plants abroad. You know that in the early days of our Horticultural Society we used to send out collectors all over the world to get plants and send them to England to the great embellishment of our gardens. Then the Royal Horticultural Society in the middle of last century fell on rather impoverished times and that work was stopped; but there were certain great nurserymen like Veitch, who were always sending out expeditions in quest of new plants. When that came to an end certain private gardeners formed themselves into little groups and subscribed for shares in expeditions; sometimes only one or two subscribed, and sometimes a greater number, but expeditions by Forrest, Kingdon Ward, Rock, Farrer, and others were started. Now that private gardens have not got so many resources, and now that it is more difficult for them to raise seed efficiently, the Royal Horticultural Society thought it was time they stepped in, and we are now actively engaged in making arrangements with skilled collectors to go to various parts of the world where there are likely to be good, hardy, garden plants. Two men we hope are going to Spain this year. We hope next year to send two men to the North-East of India, although where exactly they are going has not yet been quite settled. We hope possibly

to get some seed from Persia, and in other directions we are going to do something material to bring in further new plants for our gardens.

We are undertaking another thing which should be of value in the future, although it will have a small beginning. Under the National Trust schemes, many of the great houses of this country are being preserved for all time for the nation, but up to the present little has been done to maintain gardens in a similar manner, and with the rising costs of upkeep there is a danger that outstanding gardens may deteriorate and be lost unless some action be taken. The National Trust and the Royal Horticultural Society are negotiating an agreement whereby it may be possible to preserve one or two of them. Only gardens of great beauty, outstanding design, or of historic interest would be considered, and those having collections of plants or trees of value to the nation, either botanically, horticulturally, or scientifically.

The National Trust is establishing a Gardens Fund to be maintained by public subscriptions and bequests; these would be used to maintain any gardens taken over by the Trust. The National Trust propose to appoint a Garden Committee, on which half the members will be nominated by the Royal Horticultural Society, to advise on the gardens and the administration of the Gardens Fund. I am sure that Fellows of the Society would welcome such a scheme, and would agree that the Society should make a contribution to the Gardens Fund and appoint members to the Garden Committee. (Applause.)

Now, Ladies and Gentlemen, I come to the changes which occur in personnel at this time of the year. The change that affected us most was the death of our old friend, Colonel Durham, shortly after the Annual Meeting which we held a year ago. He had worked very hard for the Society for a very great number of years, and it is most sad that so soon after he retired and when he was looking forward to well-earned leisure he should have died. I fear that his anxiety to do everything possible for the Society in very troubled times may have been an undue burden on him.

We are losing, but not from the same cause, I am glad to think, our Treasurer, Mr. Trotter. We owe a great debt of gratitude to him for looking after our finances as he has done most ably and industriously for a long term of years. He tells me that it is only the fact that his other engagements are becoming so pressing that compels him to tender his resignation. In his place you have elected as Treasurer, as will be announced in a few minutes, Mr. David Bowes-Lyon. Mr. David Bowes-Lyon also has banking knowledge, he has great business experience, and above all, what I think perhaps is the best thing a Treasurer of the Royal Horticultural Society can have, he has a great affection for the Society.

Mr. Leak is one of those who retire from the Council by rotation, but Mr. Leak has so many threads in his hands, is Chairman of so many Committees, and is engaged in so many activities on our behalf, that we have adopted the right which our Charter gives us to ask for his re-election without waiting for the customary year. (Applause.) As his nomination has been entirely unopposed he resumes his seat on the Council. But we do lose Dr. Hatton, the great fruit expert of East

Malling who has helped us so greatly with fruit trials and other work at Wisley, as well as with botanical questions generally. We are also losing our friend, Mr. Hay, a great gardener and a great plant lover. I am glad, however, to be able to say that we shall continue to have the advantage both of the help of Dr. Hatton and of Mr. Hay on the many Committees of which they are members. (Applause.)

In their place you have elected Mr. Bentley, an amateur gardener of great repute, a man who is prepared to look any Lily in the face and make it grow (Laughter); he is also a man well versed in banking procedure, and as there will now be six members of our Council who are familiar with banking questions, it is almost a pity that we do not seek an overdraft. (Laughter.) The second new member is Mr. E. P. F. Sutton, one of that great family and great firm which is known all over the world for that little seed from which so many good things grow; very many are the new and improved plants for which we are indebted to them. We know that Mr. Sutton himself will be a very great help to our Council.

The time is getting on, and there are other things to follow, and if I go on much longer you will say to me what an Army censor wrote as a message. He had been censoring a soldier's letter written to the girl he left behind him; there were many expressions of affection in the letter, but also a lot of indiscreet talk about the movements of troops. Obviously the letter could not be sent forward, but the censor did not want the addressee to be disappointed, so he wrote a little message and put it in the envelope, a message which I fear you might apply to me—"Your boy friend is still very fond of you, but he talks too much." (Laughter.)

In the very few further minutes that I will occupy of your time, there is just one duty which I cannot neglect, that is the duty of expressing your thanks, the Council's thanks, and the President's thanks to those who have helped us in the work of the Society. There is a good legal maxim—I was called to the Bar, perhaps that is why I talk so much—that if you make a list of things and leave one out of the list, that thing is definitely out; but that if you cover the things with some general expression, then they are all included. I therefore will not name any one individual, but I will say in regard to our staff, and I have been a member of the Council for a great many years, that we have never had a better staff than we have to-day; their ability and their devotion to the affairs of the Society, and also their enthusiasm are boundless. Secondly, we have that great mass of voluntary helpers. Fellow gardeners like helping a gardening institution. They, of course, like meeting one another. There is that friendly spirit among them, that willingness to help, which does so much for the work of our Committees and our general organization. It is beyond praise, and it makes the work of the Council and the Staff and the President very easy and very enjoyable. (Applause.)

I will ask the Treasurer, Mr. Trotter, to second the motion that I have moved.

Mr. R. D. TROTTER: Mr. President, Ladies and Gentlemen, it has been a very great pleasure and honour to me to be Treasurer of this Society for so many years, and to see it returning now to its former

strength after the war period. The President has referred to my wish to retire from being Treasurer, and I am most grateful to the Council for accepting my resignation; I have very much appreciated the generous tribute which the President has paid me this afternoon.

To come to the Society's Accounts, during the year 1947 the expenditure has increased by £12,253, before providing for deferred repairs to Vincent Square and Wisley, but against that the income has increased by £13,128. That increase is chiefly due to the considerable increase in membership and rentals from the letting of the two Halls. After making the usual appropriation of £3,366 to the Sinking Fund for the two Halls, there is a surplus of £20,852, which is £875 more than in 1946. Last year we set aside £9,000 of the surplus for deferred repairs, namely £6,000 for London and £3,000 for Wisley, and this year we have been able to spend only £1,766 of the Wisley amount, and none of that which we had provided for London. There is still a very large liability for deferred repairs, and we thought it wise to allocate a further £6,000 for London this year, and £4,000 for Wisley; and after that to add the balance of £10,800 to our General Reserve.

I will now give you a few explanations of some of the Society's Accounts, starting with the Revenue and Expenditure Account.

The salaries and wages of the London staff rose by £1,836, due to increased pay and additional staff. We have also allocated £2,400 for salaries and wages and expenses of our shows; that includes Chelsea. Expenditure on meetings of £23,900, less receipts of £22,100, was a very much larger figure than last year. This, however, includes the first post-war Chelsea Show as well as increased Hall meetings, and allocations in both cases for the time and services of our staff.

On the Revenue side, subscriptions have increased to £69,800 against £62,200, a satisfactory result due to increased membership of some 3,000. The gross figures for Hall lettings at £15,300 compare with £10,000 last year—the result of much hard work on the part of those of our staff dealing with such matters.

In the Society's Balance Sheet you will see the provisions set out for deferred repairs.

On the Assets side the various Fund investments call for no comment from me, except to mention the addition of £11,700 to General Investments, while we hold £11,000 more this year in Cash at the Bank awaiting a suitable moment for investment. That is now invested. General Reserve now stands at £54,000 after adding the year's surplus and a small amount for War Damage repairs.

I come now to the Wisley figures. There were increases in salaries and wages in all departments. Under Establishment Section, you will see a small note referring to the redemption of pension rights in 1946 which does not recur in 1947. Salaries and wages have increased by £846. The net expenditure at Wisley comes to £25,786, as against £21,182, an increase of £4,600, if you allow for the extra deferred repairs.

Two sums of £500 each which we have held for some years, the Tilden and Charrington bequests, have now been appropriated towards the cost of the *Genus Paeonia*, thus reducing the cost of publication to

the Society by £1,000. Since then we have received a further £500 from the Garsed Price Bequest, which has been utilized to form a basis for financing the publication of future monographs. We welcome this generous support from members towards the cost of our publications which is steadily rising. In addition, we have received sums of money to endow the Holford Medal, Sewell Prize and McBean Trophy Funds.

I have very much pleasure in seconding the Report. (Applause.)

The CHAIRMAN. The Report has been moved and seconded, does any Fellow desire to raise any question? If not, I will put it to the meeting.

(Motion put and carried unanimously.)

Mr. E. A. BOWLES : I rise to make two pleasant announcements having been selected to call your attention to the very excellent portrait, hanging behind me, of our very excellent President. I think you will agree with me that the Society is very fortunate in having secured such a fine picture to add to our gallery of the portraits of former Presidents.

Also I announce to you that our President very kindly consented, at the unanimous wish of the Council, to allow his name to go forward for re-election. As no other name has been put forward, under By-law 56 I have the pleasure and power, as Vice-Chairman of the Council, to announce that Lord Aberconway is duly elected our President for the forthcoming year.

The CHAIRMAN : Mr. Bowles, Ladies and Gentlemen, I thank you most cordially for re-electing me President of your great Society. It is a position which I value very much and enjoy very much. I was deeply touched, and felt much honoured, by the suggestion of the Council—I am not myself a member of the Council—that they would like to have my portrait painted, and it will be a great gratification to me to think that the portrait, which, of course, belongs to the Society, will hang in future in the rooms where I had such pleasant work to do, and in which I made so many friends. I am deeply grateful to them for their kind thought.

I now have to declare the election of the following as Vice-Presidents:

His Highness the Maharaja of Jammu and Kashmir. Our Vice-Presidents are drawn from a large circle, because we want to show that the Royal Horticultural Society is not a one-country affair. The rulers of Kashmir have been most generous in allowing us to collect plants in that great country.

Field Marshal the Rt. Hon. Jan C. Smuts representing South Africa, a very keen gardener.

The Viscount Ullswater, who presided in our Halls many years ago; he has now attained the wonderful age of 93, and is still I understand in excellent health.

Professor L. H. Bailey of the United States of America, I believe he is also very nearly 90, and when I last heard of him he was digging up palms in a tropical jungle for his collection. (Laughter and applause.)

Mr. E. A. Bowles—he has perennial youth, as you have seen to-day.

Mr. Alister Clark, who represents Australia.

Sir Frederick Moore, the oldest living holder of the V.M.H., now in his ninety-first year.

Mr. Cleveland Morgan, of Canada.

Mr. B. Y. Morrison, of the United States, who has been good enough to send over to this country some of his very finest and hardiest Azaleas.

Mr. C. T. Musgrave, once a familiar figure in these rooms, Treasurer of the Society for many years, and now I believe 85.

Mr. C. J. A. Nix, the expert on fruit.

Colonel the Hon. Sir Heaton Rhodes, representing New Zealand, and Sir William Wright Smith, the Royal Botanist of Edinburgh. Altogether a most distinguished gathering of Vice-Presidents, and I think you might like the Secretary to send our good wishes to those who are over 90. (Applause.)

Then I have to announce the election as members of Council of Mr. W. Bentley, Mr. G. W. Leak, and Mr. E. P. F. Sutton.

I also declare the election of the Hon. David Bowes-Lyon as Treasurer.

I also declare the election of Mr. F. G. Feather, of Messrs. Harper, Feather & Paterson, as Auditor of the Society.

Those elections have all been made by you; the nominations were made some time ago, and there were no alternative nominations; that is why they are now elected.

I will now make the presentations.

The SECRETARY—**Victoria Medal of Honour**—to British Horticulturists resident in the United Kingdom, and deserving special honour at the hands of the Society.

Mr. WILLIAM CLARK.

The CHAIRMAN: Mr. Clark, I have very great pleasure in presenting you with the V.M.H. Mr. Clark is known as the Organizer of the Southport Shows—in fact he is the Southport Show. Mr. Clark in the 1914 war had a most distinguished military career. The only other thing I need add about Mr. Clark is that he is a Scotsman. (Laughter.)

Mr. JOHN SIDNEY WALTER CRACKNELL: You have been very ill, and I congratulate you upon your recovery. All the world is indebted to you for your seeds. As the Managing Director of Messrs. Watkins & Simpson, you have done a very great deal for seeds, and you have in your personal capacity done great work for the Society on Fruit and Vegetable Committees, and also for the Ministry during the war.

The SECRETARY: The late Dr. PAUL LEON GIUSEPPI—his son is here to receive the medal.

The CHAIRMAN: It was a very great blow to us that your father died so soon after the award had been made of this medal. He was one of the greatest of amateur botanists. He climbed range after range of

mountains searching for the rare Alpine plants he loved, and when he had got them, no one would cultivate them better than he, and there was no one who was more liberal in giving them to his friends or in displaying them at the various meetings of the Society. We very deeply regret his loss, but his name will always fill a distinguished niche in horticultural annals.

Mr. WILLIAM JOHN MITCHELL.

The CHAIRMAN: Mr. Mitchell, I have known you for nearly thirty years, and I remember you 24 years ago when my friend Sir George Holford died. I knew that Sir George thought of you not only as a gardener but as a friend, and I know how he cooperated with you in all that great work of his, so full of taste, enterprise and interest. Since his death you have kept that great Arboretum going in difficult times as well as in easy times. You are a very great gardener, and we have much pleasure in handing you this medal with all our congratulations. (Applause.)

Mr. ARTHUR SIMMONDS, Deputy Secretary of the R.H.S.

The CHAIRMAN: Mr. Simmonds is a very old friend of you all here; he is always at our meetings, and the day before our meetings is at the Hall to a very late hour. I do not believe anyone in the world can arrange a Show better than Mr. Simmonds. Not only that, but all of you must have read those delightful articles he has written on his researches into the introduction or the origin of such familiar things as 'Cox's Orange'; I am glad to think that the Publication Committee have resolved to collect those articles which he has written in our JOURNAL and put them in book form, and a very interesting publication it will be. I congratulate you, Mr. Simmonds. (Applause.)

The SECRETARY. **Associates of Honour**—conferred on persons of British nationality who have rendered distinguished service to Horticulture in the course of their employment.

Mr. A. C. BARTLETT.
Mr. F. G. COUSINS.

Mr. J. KNELLER.
Mr. J. WILSON.

The SECRETARY. **Veitch Memorial Medal**—awarded to those who helped in the advancement and improvement of the science and practice of Horticulture, and for special exhibits.

Mr. F. J. CHITTENDEN. Mr. Chittenden is not well, and his wife has come to take the Gold Medal for him.

The CHAIRMAN: Mrs. Chittenden, I am glad to hand you this medal. No Veitch Memorial Medal has been better deserved than that awarded to your husband. He has been associated with the Society for a very great number of years, and all he has done has been done well. That fine lay-out of "Seven Acres" at Wisley will always be a thing which will mark his Directorship of the Wisley Gardens. Mr. Chittenden also keeps us straight on all kinds of awkward questions of nomenclature. I think that his book when it is published, the *Dictionary of Gardening*, will be one of the finest works on gardening ever written.

Will you give him our kind regards and congratulations. (Applause.)

Major LAWRENCE W. JOHNSTON. Major Johnston is also unwell, and Miss Hudson will receive the medal on his behalf.

The CHAIRMAN: Miss Hudson, I have here the medal given to your cousin, Major Lawrence Johnston. He is a great artist in designing gardens. There has been no more beautiful formal garden laid out since the time of the old Palace of Versailles than that designed on quite a small scale, but with exquisite artistry, by Major Lawrence Johnston at Hidcote. Not only that, but that garden is filled, as the earlier gardens were not, with interesting and beautiful plants, some of which he has himself collected in the mountains of China. No one better deserves the Veitch Memorial Medal than our old friend, Major Lawrence Johnston. Will you give him our very kindest regards and best wishes for his rapid and complete recovery. (Applause.)

The SECRETARY. **Lawrence Medal**—for the best exhibit shown to the Society during the year.

The NATIONAL FARMERS UNION, represented by Mr. Gardiner.

The CHAIRMAN: Mr. Gardiner, we all of us remember that wonderful exhibit you staged at Chelsea. It showed what farmers could do in the way of horticulture when they turned their minds really to it. I think some horticulturists thought—what shall we do if the farmers grow all the peas and beans and turnips, and all the things we previously grew for the market? But I do not think that will ever happen, because if there is a glut of one kind of vegetable, with modern methods we will be able to preserve the surplus and use it later on to help our food supplies. In fact, I think the farmers will have to adopt that American saying, "We eat what we can and we can what we can't." (Laughter.) I congratulate you upon a great triumph of organisation. (Applause.)

The SECRETARY: **Holford Medal**—for the best exhibit of plants and/or flowers (fruit and vegetables excluded) shown by an amateur during the year in the Society's Hall.

Mr. G. P. HARBEN.

The CHAIRMAN. I am glad to see you to-day. Your exhibits of Cymbidiums have been wonderful. You have continued the cultivation of that most beautiful genus of plants at a time when horticulture was difficult, when coal was not too plentiful, when labour was scarce, and you have taken on your shoulders the mantle of those two great amateur growers, Sir George Holford and Mr. Lionel de Rothschild. We saw your exhibit with the greatest possible pleasure; we congratulate you on it, and hope it will be repeated. (Applause.)

The SECRETARY. **Sander Medal**—for the best new greenhouse plant of general utility shown to the Society during the year.

Major LIONEL DE ROTHSCHILD. Major de Rothschild unfortunately could not be here, and Mrs. de Rothschild is here to receive the medal.

The CHAIRMAN: I have such pleasure in handing you the medal for one of your son's beautiful Nerines. It is a greater pleasure because that Nerine, called 'Lionel' as it was, recalls to us the name that will always

be enshrined with us as one of the greatest amateur gardeners and one of the best of friends. (Applause.)

The SECRETARY. **George Moore Medal**—for the best new Cypripedium shown to the Society during the year.

Mr. E. M. JENSEN.

The CHAIRMAN: You are emulating Mr. George Moore, the founder of this medal, who had a wonderful collection of Cypripediums many years ago, and the one that you showed that won this medal was a very outstanding Cypripedium. I congratulate you. (Applause.)

The SECRETARY. **Williams Memorial Medal**—for the best group of plants and/or cut blooms of one genus (fruit and vegetables excepted) which show excellence in cultivation, shown during the year.

Messrs. ROBERT BOLTON & SONS, represented by Mr. Bolton.

The CHAIRMAN: We all of us remember that great group of Sweet Peas that you showed at one end of the Chelsea Tent last summer. Every bloom was fragile as Sweet Peas always are, but every bloom was in perfect condition, and it was a symphony of colour so beautifully arranged that it was one of the loveliest groups of plants we have ever seen. (Applause.)

Messrs. KONYNENBERG & MARK, represented by Mr. John H. Bader.

The CHAIRMAN: Mr. Bader, it is a very great pleasure to me to give you this small recognition of the wonderful show of Gladioli which you staged on August 12 in our Hall. We welcome very cordially our friends from beyond the seas, especially from that great horticultural nation of Holland which has always been famous for its gardening, and particularly for its bulbs; from the time of the Black Tulip downwards, it has always been "Holland for bulbs." I congratulate you. (Applause.)

The SECRETARY. **A. J. Waley Medal**—awarded annually to a professional gardener who has done good work for Rhododendrons.

Mr. R. L. HARROW.

The CHAIRMAN: Mr. Harrow, this is the first award of this medal founded by Mr. Waley as a recognition of what people have done in the actual raising of Rhododendrons. You have raised Rhododendrons brought by the Farrer, Forrest, Kingdon Ward and Rock expeditions; you must have raised hundreds of thousands at Edinburgh, and as the result of your skill they have been distributed throughout Great Britain. I do congratulate you on this award for Rhododendrons. (Applause.)

Reginald Cory Memorial Cup—offered with the view of encouraging the production of hardy hybrids of garden origin, and awarded only to the raiser of a plant that is the result of an intentional cross. Only a hybrid of which one parent is a true species is eligible, and it must have been exhibited at one of the Society's Shows and received an award during the current year. Hybrids of annuals and biennials do not come under the scope of the award.

Lord ABERCONWAY, C.B.E., V.M.H.

Mr. E. A. BOWLES. I must say that, in handing this Cup to our President, never has a plant that is awarded the Cup been more beautiful, and really more useful than his cross of two *Viburnums* which has resulted in *V. × bodnantense*. I expect it will be one of the finest of all garden shrubs, and therefore well worthy of this wonderful Cup, which I am so pleased to present to our President. (Applause.)

The CHAIRMAN: Thank you, Mr. Bowles. I accept this Cup on behalf of my plant, and of those who helped to make the hybrid, because I did not make it "with my own fair hands." We made a lot of crosses of *Viburnums*; most of them did not take, but this one definitely did, and we now find that it grows very successfully with us, I am very much honoured to have received this Cup. (Applause.)

Alderman AVELING (Southport): I hope you will forgive another old man on the floor of the House, because the resolution I have to propose I know will be passed as unanimously as any resolution that has been put before us. It is

THAT a very hearty Vote of Thanks be given to His Lordship for presiding over this meeting to-day.

I am sure everyone has been struck to-day at the masterly way in which our President has presented the Report, and with his marvellous address. We have sat here like school children and had what I call a wonderful educational address, because if you have made notes of what our President has said to-day, then my vision shows me that the gardens of England are going to be more beautiful than they have ever been before. I am certain of this, that if we follow His Lordship's advice, we shall have more beauty in the land than we have to-day. May I, on behalf of all of us on the floor of the House, and indeed of a far larger audience, that of all the Fellows of the Society, wish His Lordship perfect health for many years to come. May many of us here, and many who are not here to-day, perhaps of the younger generation, be able to sit, as we have sat, and listen to one who is not only a great industrialist, but a power in the horticultural world. He did say he was a Barrister, I am glad he left the profession because I think he has gone to a nobler one. It is indeed fitting that the last presentation should be made to our President for introducing something which I believe from what I have read is going to give pleasure to many thousands for many years to come.

On behalf of all assembled, I move that a most sincere Vote of Thanks be accorded to our President. I will ask my friend, Mr. Curtis, to oblige by seconding.

Mr. CURTIS. As a member of the Fourth Estate it gives me very great pleasure to second the Vote of Thanks so ably moved by my old friend Alderman Aveling of Southport. This seems to be a good day for the old timers, which reminds me that I think I hold the record for official services in connection with the Royal Horticultural Society.

I endorse all Alderman Aveling has said with regard to our President. We have known each other a good long while. May I express the hope

that our President will have health and strength for many years to come and that by the time he is able to take cones off the *Metasequoia* in his own garden, he will still be President of the Royal Horticultural Society. (Applause.)

The CHAIRMAN: Alderman Aveling, Mr. Curtis, Ladies and Gentlemen, I thank you for the most kind way you have moved, seconded and received this Vote of Thanks. It is always a real pleasure and interest to me to preside at these meetings, and I hope that you may permit me to do so at any rate for a short while longer, but by the time the *Metasequoia glyptostroboides*—you missed the last part of the name—bears cones, I think you will have at this desk a polyploidal President. (Laughter and applause.)

(*The proceedings then terminated.*)

GENERAL MEETINGS

DECEMBER 2, 1947

FLORAL COMMITTEE B—Lord ABERCONWAY, C.B.E., V.M.H., in the Chair, and nineteen other members present.

Awards Recommended :

Banksian Medal

To the Kew Topiary Nurseries, Richmond, for an exhibit of clipped box trees.
To Mr. F. Street, Woking, for an exhibit of hardy Heaths.

Award of Merit

To *Euonymus semiexsertus* as a hardy, ornamental-fruited shrub (votes unanimous), from the Director, R.H.S. Gardens, Wisley. (See p. 27.)

To *Viburnum × bodnantense (fragrans × grandiflorum)* as a hardy, flowering shrub (votes unanimous), from Lord Aberconway, C.B.E., V.M.H., Bodnant, N. Wales. (See p. 50.)

Other Exhibits

Celastrus orbiculatus, exhibited by the Director, R.H.S. Gardens, Wisley.

Viburnum lobophyllum, exhibited by Lord Aberconway, C.B.E., V.M.H.

Gentians, exhibited by Mr. C. Newberry, Knebworth.

Alpine plants, exhibited by Orchard Neville Nurseries, Baltonsborough.

ORCHID COMMITTEE—Mr. GURNEY WILSON, F.L.S., V.M.H., in the Chair, and thirteen other members present.

Awards Recommended :

Award of Merit

To *Brassolaeliocattleya* 'Denham' var. 'Majestic' (*Bc.* 'Dr. G. Macdonald' × *Lc.* 'Britannia'), (votes 12 for, 0 against), from Mr. Clint McDade, Chattanooga, Tennessee, U.S.A. (See p. 49.)

To *Odontioda* 'Wedding Bells' (*Oda.* 'Topa' × *Oda.* 'Chantos') (votes 9 for, 0 against), from Messrs. Charlesworth & Co., Haywards Heath. (See p. 49.)

To *Laeliocattleya* 'Golden Radiance' (*Lc.* 'Fulva' × *Lc.* 'Golden Gleam'), (votes 9 for, 1 against), from Messrs. H. G. Alexander, Ltd., Tetbury, Glos. (See p. 49.)

Other Exhibits

Cypripedium 'Whitemoor' ('F. C. Puddle' × 'Dervish'), from Sir William Cooke, Bt., Wyld Court, Hampstead Norris.

Cattleya 'White Ensign,' and *Cypripedium* 'Judith Dance,' from Mr. D. A. Cowan, Surbiton.

Cypripedium 'Miracle,' and *Sophrolaelia* 'Psyche,' from Messrs. Sanders, St. Albans.

Odontonia 'Avrilance,' from Messrs. Charlesworth & Co.

JANUARY 13, 1948

FRUIT AND VEGETABLE COMMITTEE—Mr. A. CHEAL in the Chair, and nine other members present.

Exhibits

Seedling Apple ('Worcester Pearmain' × 'Newton Wonder'), from J. F. Wastie, Esq., Eynsham, Oxford.

Seedling Apple from R. Alexander, Esq., Pooles, The Green, Urchfont, Devizes, Wilts.

Seedling Apple from L. Tivey, Esq., 26 Victoria Street, Melbourne, nr. Derby.

ORCHID COMMITTEE—Mr. GURNEY WILSON, F.L.S., V.M.H., in the Chair, and fifteen other members present.

Awards Recommended :

Award of Merit

To Miltoniada 'Carol' (Miltoniada 'Lilian' × Miltonia pulchra) (votes 12 for, 0 against), from Messrs. Charlesworth & Co., Haywards Heath, Sussex.

To Lycaste 'Barbara Sander' (Skinneri × Balliae) (votes 11 for, 0 against) from Messrs. Sanders, St. Albans.

To Sophrolaeliocattleya 'Cicely Watson' (Lc. 'St. Gothard' × Slc. 'Vulcan') (votes 14 for, 0 against), from Messrs. Black & Flory, Slough.

To Cyripedium 'Golden Moon' ('Hancar' × 'Gold Mohur') (votes 12 for, 0 against), from Messrs. H. G. Alexander, Tetbury, Glos.

To Cyripedium 'Snow Bunting' var. 'Muriel' ('Florence Spencer' × 'F. C. Puddle') (votes 12 for, 0 against), from Messrs. H. G. Alexander, Tetbury, Glos.

DONATIONS TO THE SOCIETY'S GARDENS AT WISLEY, 1947

ABERCONWAY, Lord, Bodnant; plants, seeds. ADAMS, R., Wisley; seeds. ADAMSON, Mrs., Bovey Tracey; seeds. ADIE, E. J., Wentworth; plants. ALLARDYCE, G. McM., Nairn; seeds. AMSLER, Dr. M., Hawkhurst; plants. ANDERSON, Lt.-Col. R., Wokingham; seeds. ANTWERP BOTANIC GARDENS; seeds. APPLETON, H. W., South Ruislip; seeds. APTED, Mrs. D., Newlyn; plants. ARNOLD ARBORETUM, Boston, Mass.; cuttings; seeds. ASLETT, W. K., Barnham; plants. BAKERS, Messrs., Codsall; scions. BAKER, G. P., Sevenoaks; seeds. BALFOUR GOURLAY, W., Cambridge; plants and seeds. BARCOCK, F. G., Bury St. Edmunds; seeds. BARNES, W., Bexhill; scions. BARRES ARBORETUM, France; seeds. BARR & Sons, Covent Garden; bulbs. BATES, W., Wokingham; plants. BATT, Col., Norwich; cuttings. BASLE BOTANIC GARDENS; seeds. BENTLEY, W., Newbury; cuttings and seeds. BERGE BOTANIC GARDENS, Stockholm; seeds. BENSON, C. E., London, E.C. 2; seeds. BERNE UNIVERSITY BOTANIC GARDENS; seeds. BERRY, Mrs. A. C. M., Portland, Oregon; seeds. BIMBERRY, Miss B. D., Glastonbury; scions. BISHOP, G. O., Worcester; canes. BISHOP, W. V., Harrogate; plants. BIRD, A. G., Canterbury; canes. BOND, Mrs. H. V., Wareham; cuttings. BOOTHMAN, STUART, Maidenhead; seeds. BOTANICAL EXCHANGE CLUB, London; plants. BOWEDON, J., Warrington; seeds. BOWLES, E. A., Enfield; plants, seeds and bulbs. BOYKO, Dr., Palestine; rhizomes. BRAMMALL, Lt.-Col. L. H., Salisbury; plants. BRIGGS, A. G., Kilworth Harcourt; seeds. BROWN, E. J., Southampton; seeds. BROWN, J. J., Westcliff-on-Sea; seeds. BRUMMAGE, J. H., Norwich; seeds. BRUMMITT, Mrs. F. L., Banbury; seeds. BUCKTHORP, S. C., Bugle; scions. BUDAPEST UNIVERSITY BOTANIC GARDENS; seeds. BUENOS AIRES BOTANIC GARDEN; seeds. BULLER, A. C., Stellenbosch, S. Africa; plants, seeds and bulbs. BUXTON, Prof. P. A., Gerrards Cross; seeds. BYNG OF VIMY, Viscountess, Thorpe-le-Soken; seeds. CADREY, Mrs. P. G., New Barnet; seeds. CAMBRIDGE BOTANIC GARDENS; seeds. CAMPBELL, C. J., Tasmania; seeds. CAMPBELL, Sir GEORGE, Minard; seed. CANTONSPARK BOTANIC GARDENS, Baarn, Holland; plants. CAPEL CURE, W. E., Sutton-by-Dover; seeds. CATCHPOLE, J., Nairobi; seeds. CHASE, Mrs., Cobham; seeds. CHELSEA PHYSIC GARDEN; seeds and plants. CITTA UNIVERSITY BOTANIC GARDENS, Rome; seeds. CLARK, J. S., Princetown University, U.S.A.; seeds. CLARKSON, Miss G. E., Salisbury, S. Rhodesia; seeds. CLAY, Dr. R. C. C., Salisbury; seeds and plants. CLAYDON, Miss M., Parkstone; plants. COALS, H., Maidenhead; seeds. COIMBRA UNIVERSITY BOTANIC GARDENS, Portugal; seeds. COLE, H. P., Codford; scions. CONSTABLE, Messrs. W. A., Tunbridge Wells; plants. COOK, R. B., Corbridge; plants. COOMBS, F., Trowbridge; plants. COPENHAGEN UNIVERSITY BOTANIC GARDENS; seeds. CORREVON, A., Geneva; plants. COUTTS, J., Woking; seeds. CROOK, H. CLIFFORD, Bromley; seeds. DANIELS, Miss M. J. G., Norwich; seeds.

(To be continued)

Extracts from THE PROCEEDINGS OF THE ROYAL HORTICULTURAL SOCIETY

GENERAL MEETINGS

FEBRUARY 17, 1948

FRUIT AND VEGETABLE COMMITTEE—Mr. F. A. SECRETT, C.B.E., in the Chair, and twenty-five other members present.

Awards Recommended :

Gold Medal

To the Governors of St. Andrew's Hospital, Northampton, for a group of vegetables. (Votes 21 for, 0 against.)

Silver-Gilt Knightian Medal

To Messrs. Sutton & Sons, Ltd., Seedsmen, Reading, for a group of vegetables.

Other Exhibits

Seedling Dessert Apple and Seedling Culinary Apple from S. G. Brooks, Esq., 14 Kingsley Gardens, Cheltenham.

Seedling Apple from Mrs. M. M. Lee, 48 Sutton, nr. Eynsham, Oxon.

Apples 'Oxford Yeoman,' 'Oxford Friend' and Seedling Apple from J. F. Wastie, Esq., Eynsham, Oxon.

Apple 'George Miller' from Mr. G. J. Miller, Bayham Abbey Gardens, Lamberhurst, Kent.

Apple 'Trojan' from W. F. P. Stockham, Esq., Rothsay, 211 Harefield Road, Uxbridge, Middlesex.

FLORAL COMMITTEE A—Mr. G. W. LEAK, V.M.H., in the Chair, and twenty-one other members present.

Awards Recommended :

Gold Medal

To Messrs. Blackmore & Langdon, Bath, for an exhibit of Cyclamen.

Silver-gilt Banksian Medal

To Messrs. Walter Blom & Son, Ltd., Leavesden, for an exhibit of Daffodils, Hyacinths, etc.

To Parigo Horticultural Co., Ltd., Spalding, for an exhibit of Freesias.

Silver Floral Medal

To Messrs. Allwood Bros., Ltd., Haywards Heath, for an exhibit of Carnations.

Silver Banksian Medal

To Messrs. Constable, Ltd., Southborough, for an exhibit of Lachenalias, Freesias, etc.

To Messrs. Napier, Taunton, for an exhibit of Carnations.

Flora Medal

To Messrs. Biddlecombe Bros., Bracknell, for an exhibit of Carnations.

To Messrs. C. Engelmann, Ltd., Saffron Walden, for an exhibit of Carnations.

To Messrs. Toogood & Sons, Ltd., Southampton, for an exhibit of *Primula obconica* "Giant Hybrids."

To Messrs. Wakeley Bros., London, for an exhibit of Daffodils, Tulips, Crocuses, etc.

Selected for trial at Wisley

Primula malacoides 'Ambassador.'

" " 'Elfin.'

" " 'Romance.'

" *sinensis* 'Gaiety.'

" " 'Giant Royal Pageant.'

" " 'Giant Startler.'

" " 'Loveliness.'

} from Messrs. Sutton & Sons Ltd.,
Reading.

Other Exhibits

Polyanthus and coloured Primroses, from Mr. C. Newberry, Knebworth.

Primula malacoides 'Chorleywood,' from Mr. G. W. Stacey, Chorleywood.

FLORAL COMMITTEE B—Lord ABERCONWAY, C.B.E., V.M.H., in the Chair, and twenty other members present.

Awards Recommended :

Silver Flora Medal

To Lord Aberconway, C.B.E., V.M.H., Bodnant, for an exhibit of *Primulas* of the *Petiolares* Section and hybrid *Rhododendrons*.

To Mr. K. W. Harle, Lower Basildon, for an exhibit of succulents.

Silver Banksian Medal

To Messrs. J. Cheal & Sons, Crawley, for an exhibit of flowering shrubs.

To Messrs. Hillier & Sons, Winchester, for an exhibit of flowering shrubs.

To Messrs. W. E. Th. Ingwersen, Ltd., East Grinstead, for an exhibit of alpine plants.

To Messrs. L. R. Russell, Ltd., Windlesham, for an exhibit of flowering shrubs and trees.

Flora Medal

To Messrs. Burkwood & Skipwith, Ltd., Kingston, for an exhibit of flowering shrubs.

To Messrs. R. Gill & Son, Penryn, for an exhibit of *Rhododendrons* and *Anemones*.

To Messrs. W. H. Rogers & Son, Eastleigh, for an exhibit of flowering shrubs.

To the Stocklands Estate, Bewdley, for an exhibit of rock garden plants and shrubs.

To Mr. F. Street, Woking, for an exhibit of Heaths and other flowering shrubs.

To the Waterperry Horticultural School, Oxford, for an exhibit of rock garden plants.

To Winkfield Manor Nurseries, Ascot, for an exhibit of rock garden plants and shrubs.

Banksian Medal

To the Kew Topiary Nurseries, Richmond, for an exhibit of clipped box trees.

To Mr. M. P. Kooper, Ferndown, for an exhibit of flowering shrubs and rock garden plants.

To Orchard Neville Nurseries, Baltonsborough, for an exhibit of rock garden plants.

To Messrs. M. Prichard & Sons, Christchurch, for an exhibit of rock garden plants.

Award of Merit

To *Camellia* 'Cornish Snow' (*saluenensis* × *cuspidata*), as a hardy flowering shrub (votes 12 for, 0 against), from C. Williams, Esq., M.P., Caerhays Castle, Cornwall.

To *Camellia japonica alba grandiflora*, as a hardy flowering shrub (votes 16 for, 0 against), from C. Armytage Moore, Esq., Cranleigh.

To *Camellia reticulata* seedling var. *superba*, as a hardy flowering shrub (votes 17 for, 0 against), from C. Williams, Esq., M.P., Caerhays Castle, Cornwall.

To *Chimonanthus praecox* var. *luteus*, as a hardy flowering shrub (votes 17 for, 0 against), from Messrs. R. C. Notcutt, Ltd., Woodbridge.

To *Prunus cerasifera* var. *Lindsayae*, as a hardy flowering tree (votes unanimous), from the Director, Royal Botanic Gardens, Kew.

Cultural Commendation

To Mr. E. Griffin, gardener to Lady Buchanan, St. Anne's Manor, Sutton Bonington, for an exhibit of *Echeveria retusa hybrida*.

Other Exhibits

Arundinaria fastuosa, exhibited by M. Haworth-Booth, Esq., Haslemere.

Camellia japonica var., *Mahonia Bealii*, *M. japonica*, *M. napaensis*, *Pieris japonica* var. *variegata*, *Sycopsis sinensis*, exhibited by G. H. Dowty, Esq., Haslemere.

Camellia 'Hiraethlyn', *Magnolia Kobus*, *Viburnum lobophyllum*, exhibited by Lord Aberconway, C.B.E., V.M.H., Bodnant.

Camellia japonica var., exhibited by C. Armytage Moore, Esq., Cranleigh.

Crocus Susianus var. *minor*, *Crocus Suterianus* var. 'Jamie,' exhibited by Messrs. R. Wallace & Co., Tunbridge Wells.

Helleborus cyclophyllus, exhibited by Mark Colville-Grant, Esq., Kew Green.

Helleborus lividus × *corsicus*, exhibited by Messrs. T. Hilling & Co., Chobham, Woking.

Prunus cantabrigiensis, *Sycopsis sinensis*, exhibited by the Director, University Botanic Garden, Cambridge.

Prunus Pissardii tricolor, exhibited by A. T. Barnes, Esq., Bedford.

Salvia sp., exhibited by P. M. Syngé, Esq., West Byfleet.

Collection of hardy flowering shrubs and herbaceous plants, exhibited by the Director, R.H.S. Gardens, Wisley.

ORCHID COMMITTEE—Mr. GURNEY WILSON, F.L.S., V.M.H., in the Chair, and eighteen other members present.

Awards Recommended :

Gold Medal

To Messrs. Sanders, St. Albans, for a group of Orchids.

Silver Flora Medal

To Messrs. Stuart Low & Co., Jarvis Brook, Sussex, for a group of Orchids.

Silver Banksian Medal

To Messrs. Charlesworth & Co., Haywards Heath.

First-class Certificate

To *Cymbidium* 'Memoria S. G. Alexander' ('Rosanna' × 'Pharos') (votes 15 for, 0 against), from Messrs. H. G. Alexander, Tetbury, Glos.

To *Cymbidium* 'Remus' ('Regulus' × 'Joyful') (votes 17 for, 0 against), from H. W. B. Schroder, Esq., Dell Park, Englefield Green.

Award of Merit

To *Cymbidium* 'Vulcan' ('Pocahontas' × 'President Wilson') (votes 14 for, 1 against), from Messrs. H. G. Alexander, Tetbury, Glos.

To *Cymbidium* 'Ispahan,' Exbury var. (*Lowio-grandiflorum* × 'Rosanna') (votes 12 for, 2 against), from Edmund de Rothschild Esq., Exbury, Southampton.

To *Cymbidium* 'Radax' ('Claudette' × 'Pearl') (votes 16 for, 0 against), from McBean's Orchids, Ltd., Cooksbridge, Sussex.

To *Odontioda* 'Pola' (*Oda*. 'Brenda' × *Oda*. 'Marie Antoinette') (votes 10 for, 0 against), from Messrs. Charlesworth & Co., Haywards Heath.

To *Cypripedium* 'Greenstede' ('Golden Moon' × 'Dickler') (votes 14 for, 0 against), from Mr. S. Farnes, East Grinstead.

To *Odontonia* 'Carlanie,' (var. 'Babylon') (votes 12 for, 2 against), from Messrs. Sanders, St. Albans.

To *Cymbidium* 'Ruskin' ('Ceres' × 'Pearl') (votes 14 for, 1 against), from G. P. Harben, Esq., Calmore, Southampton.

NARCISSUS AND TULIP COMMITTEE—Mr. E. A. BOWLES, F.L.S., F.R.E.S., V.M.H., in the Chair, and ten other members present.

Awards Recommended :

Award of Merit

To Narcissus 'Dutch Master' as a variety for cultivation in pots, pans or bowls (voting 8 for, 1 against). Shown by Messrs. G. Zandbergen-Terwegen, Sassenheim, Holland.

Silver Banksian Medal

To Messrs. R. Wallace & Co., The Old Gardens, Tunbridge Wells, for an exhibit of Daffodils and Tulips.

Other Exhibit

A group of Daffodils and Tulips from Messrs. G. Zandbergen-Terwegen.

RHODODENDRON COMMITTEE—Mr. J. B. STEVENSON, V.M.H., in the Chair, and eight other members present.

Awards Recommended :

First Class Certificate

To × *Rhododendron* 'Choremia' (*R. haematodes* ♀ × *R. arboreum* ♂) (votes unanimous), as a hardy, early-flowering hybrid, from Lord Aberconway, C.B.E., V.M.H., Bodnant, N. Wales. This outstanding crimson-scarlet hybrid received the A.M. on February 21, 1933, and is described in the R.H.S. JOURNAL, Vol. 59, page xxxv.

Award of Merit

To × *Rhododendron* 'Androcles' (*R. calophytum* ♀ × *R. arboreum* ♂) as a hardy flowering shrub (votes unanimous), from E. de Rothschild, Esq., Exbury House, Southampton.

Other Exhibits

Rhododendron Kaempferi var. *sempervirens*, which the Committee desired to see again, and × *R. 'Ramillies'* (*R. 'Ethel'* × *R. 'Redwing'*), from Lord Aberconway.

× *Rhododendron* 'Cornubia' (*R. Shilstonii* × *R. arboreum*) A.M. 1912, from M. Haworth-Booth, Esq., Farrall, Haslemere.

JOINT ROCK GARDEN PLANT COMMITTEE—Col. F. C. Stern, O.B.E., M.C., F.L.S., V.M.H., in the Chair, and fifteen other members present.

Awards Recommended :

Cultural Commendation

To Mr. C. Puddle, gardener to Lord Aberconway, C.B.E., V.M.H., Bodnant, North Wales, for an extremely well-grown pan of *Primula bracteosa*.

Other Exhibits

Primula Allioni var. 'Celia,' from Mrs. H. M. Earle, The Highlands, 82 Ridgeway, Enfield, Middx.

Primula 'scapeosa' (*P. scapigera* × *bracteosa*) and *Primula 'Pandora'* (*P. scapigera* × *P. Edgeworthii*), from Mrs. C. B. Saunders, Husseys, Green Street Green, Farnborough, Kent, and *Euphorbia biglandulosa*, from Messrs. A. R. & K. M. Goodwin, Stocklands Estate, Bewdley, Worcs.

DONATIONS TO THE SOCIETY'S GARDENS AT WISLEY 1947—cont.

DAPLYN, W. E., Washington; seeds. DAWKINS, G. M., Sheerness; seeds. DAVENPORT-JONES, Miss H., Hawkhurst; plants. DAVIES, Col., Camberley; seeds. DAVIES, G., Bristol; scions. DAYRELL-REED, T., Wimborne; seeds. DE BELLE, Mrs. A. C., Hurlingham, Argentina; seeds. DELFT BOTANIC GARDENS, Holland; seeds. DICKENSON, J., Rusap, S. Rhodesia; seeds. DIJON BOTANIC GARDEN; seeds. DONARD NURSERY CO., County Down; plants. DRYSDALE WOODCOCK, Judge H., Stroud; seeds. DUCANE, Gen. Sir JOHN, London, W. 1; bulbs. DUFF, Lady, Dunkeld; seeds. DUNNE COOKE, Capt. H. J., London, W. 1; seeds and plants. DURNFORD, Mrs. L., Wimborne; seeds. EAST MALLING RESEARCH STATION; cuttings. EDINBURGH ROYAL BOTANIC GARDENS; seeds and plants. ELEV, C., East Bergholt Place; seeds and plants. EVANS, Major J. D. D., Brecon; seeds. FANG, Prof., China; seeds. FARQUHARSON, D. J., Woking; seeds. FAWKES, Miss M. C., Black Bourton; seeds. FEREDAY, F., Ewell; seeds. FIEDLER, S. G., Claygate; plants. FINZI, G., Newbury; scions. FISHER, Lord, Thetford; scions. FLOREALP BOTANIC GARDENS, Switzerland; seeds. FORBES, J., Hawick; plants. FORBES WHITE, H., Chichester; seeds. FOSTER, Miss D. P., Liskeard; plants. FOX, Mrs., Peckskill, New York; seeds. FRANKFURT-AM-MAIN BOTANIC GARDENS; seeds. FRENCH, Major F. C. D., Putney; seeds. FROUDE, Mrs. A., Kingsbridge; plants. GALE, Dr. J. N., Norwich; seeds. GAMLIN, A. G. N., St. Albans; seeds. GARLICK, J. H., Shepperton; plants. GARNETT-BOTFIELD, Mrs. S., Wolverhampton; plants. GASKOM, Miss M. B., London, S.W. 3; plants. GATTEFOSSE, J., Ain Sebâa, Morocco; seeds. GENEVA BOTANIC GARDENS; seeds. GERBER, Miss J., Weybridge; plants. GIBSON, A. T., West Wickham; seeds. GILLILAND, Com. F., Londonderry; seeds. GILMOUR, J. S. L., Wisley; plant. GLEADON, Miss V. M., Hailsham; seeds. GLOVER, R., London, N.W.; seeds. GOODEY, Dr. T., St. Albans; seeds. GOTHENBURG BOTANIC GARDENS; seeds. GOUGH, R. E., Dover; plant. GRAZ UNIVERSITY BOTANIC GARDENS, Austria; seeds. GREATOREX, H. A., Norwich; bulbs. GREENWOOD, Mrs., Harrogate; seeds. GRONINGEN BOTANIC GARDENS, Holland; seeds. GUNNER, D. H., Canterbury, Australia; seeds. GURNEY, R., Oxford; seeds. HADDEN, N. G., West Porlock; seeds and plants. HADFIELD, J., Rochdale; seeds. HALL, Mrs. Z., Donabate; seeds. HANGER, F., Wisley; seeds. HARBEN, Mrs. M. R., Great Bookham; seed. HARRINGTON, A. C., Kilsyth; seeds. HARROGATE PARKS DEPT.; plants. HARRISON, Mrs. R. A., Hawkhurst; plants and seeds. HARTLEY, W., Canberra; seeds. HARVEY, Miss E. J., Padstow; scions. HAWKES, Mrs. K., Bitchington; seeds. HAWLEY, T., West Hallam; seeds. HAWORTH BOOTH, M., Haslemere; cuttings. HAYES, E. S., Surbiton; seed. HAYSOM, Southampton; seeds. HELY-HUTCHINSON, Mrs. J., Ely; plants. HENRY, Mrs. N. J., Pennsylvania; seeds. HIGGINS, Mrs. V., E. Croydon; seeds. HIGGS, R. P., Guildford; plants. HILLING, Messrs., Chobham; cuttings, seeds and plants. HILLS, L. D., Wells; plant. HIRST, H. M., Newby; seeds. HITCHEN, Dr. C. S., Kirkup, Iraq; seeds. HOLLIDAY, Miss O. M., Leeds; scions. HORSFALL, Mrs. B., Pangbourne; seeds. HOWTH DEMESNE GARDENS, Dublin; seeds. HUEFFER, Mrs., Mersham; scions. HUTCHINSON, Mrs. W., Finchampstead; seeds. ILSLEY, L. G., Felpham; seeds. INGRAM, Capt. COLLINGWOOD, Benenden; plants and seeds. INNSBRUCK UNIVERSITY BOTANIC GARDENS; seeds. IRONSIDE, A. A., Ruam Minor; seeds. JACKMAN, Messrs., Woking; plants. JANAKI AMMAL, Dr. E. K., Wisley; plants. JARY, Miss C. L., Sleaford; cuttings. JENKIN, Dr. N. W., Hindhead; plants. JENKINS, Sir GILMOUR, Maldon; scions. JEX BLAKE, Miss M., Nairobi; seeds. JONES, J. H., Leighton Buzzard; plants. JONES, C. H., Borden; plants. JOHNSON, G. H., Cornwall; bulbs. JOHNSTON, Major L., Chipping Campden; cuttings. KAYE, W., Guildford; plants and cuttings. KAZATHETAN REPUBLIC BOTANIC GARDENS; U.S.S.R.; seeds. KEW ROYAL BOTANIC GARDENS; seeds, cuttings and plants. KIER, T. L., Bromborough; seeds. KING, W., Camberley; plants. KIRKBRIDE, Mrs. D. D., Southampton; seeds. KLUIS, A., Boskoop; plants. KNAPHILL NURSERY, Woking; plants. KNIGHT, L. G., Leeds; cuttings. KOEFTEN, Baron VAN, Marlborough; scions. KRAKOW UNIVERSITY BOTANIC GARDENS; seeds. KROWENDERG, Miss, Wageningen, Holland; plants.

(To be continued)

Extracts from THE PROCEEDINGS OF THE ROYAL HORTICULTURAL SOCIETY

GENERAL MEETINGS

OCTOBER 22, 1947

JOINT ROCK GARDEN PLANT COMMITTEE :—

Arising out of Previous Minutes :—

April 22, 1947. A.M. to *Androsace imbricata* this plant received the Award in 1930 as *Androsace argentea* as reported in the JOURNAL, Vol. 56, page xxvi.

May 20, 1947. P.C. to *Linum iberidifolium* × *flavum*, notification has been received from Messrs. W. E. Th. Ingwersen, Birch Farm Nurseries, Gravetye, East Grinstead, Sussex, that the correct parentage is *Linum iberidifolium* × *campanulatum* and the plant has now been named *Linum* × *Gemell's Hybrid*.

MARCH 2, 1948

SCIENTIFIC COMMITTEE—Mr. E. A. BOWLES, M.A., F.L.S., F.R.E.S., V.M.H., in the Chair, and ten other members present.

'Locust.'—Mr. W. E. H. Hodson showed a specimen of a large grasshopper (*Acridium aegypticum*) which had been intercepted at Newhaven on imported vegetable produce from Southern France.

Abnormal Tulip Development.—Mr. F. O. Mosley showed specimens of abnormal forced tulip bulbs in which the young leaves instead of being erect and piercing the soil by their tips had become bent over behind the tip at a very early stage of development, i.e. before emerging from the bulb, so that further growth resulted in a blunt-nosed shoot with the tips of the leaves pointing downwards and the leaves enwrapped and unable to free themselves. The cause of this abnormal development was unknown. It had been noted only in forced bulbs of 'Rose Copeland' and other 'Copeland' tulips.

Trapa bicornis.—Mr. C. H. Hooper showed a two-horned fruit from China which was identified as *Trapa bicornis*.

Laciniate-leaved Helleborus seedlings.—Leaves of *Helleborus foetidus* and a laciniate-leaved variety of this were sent by Mr. E. Broughton Barnes from Lydford, Devon. The original plant was raised from seed collected in the Jura about 1926; early in 1947 Mr. Barnes noticed that, on a narrow section of the circle of self-sown seedlings around the plant, the young plants had laciniated leaves. Out of 77 seedlings counted, there were seven with laciniated leaves. No members of the Committee were acquainted with this interesting mutation.

FRUIT AND VEGETABLE COMMITTEE—Mr. A. CHEAL in the Chair, and twelve other members present.

Exhibits

Apple 'Norfolk Honey Russet,' from Frank Frost, Esq., Fruit Grower, Ashby St. Mary, Norwich, Norfolk.

Seedling Apple, from Viscount Hardinge, South Park, Penshurst, Kent.

FLORAL COMMITTEE A—Mr. G. W. LEAK, V.M.H., in the Chair, and fifteen other members present.

Awards Recommended :

Silver Flora Medal

To Messrs. Allwood Bros., Ltd., Haywards Heath, for an exhibit of Carnations.

To Messrs. R. H. Bath, Ltd., Wisbech, for an exhibit of Freesias.

To Parigo Horticultural Co., Ltd., Spalding, for an exhibit of Freesias.

Silver Banksian Medal

To Southern Growers, Ltd., Groombridge, for an exhibit of Daffodils, Tulips, Crocuses, etc.

Flora Medal

To Messrs. Napier, Taunton, for an exhibit of Carnations.

To Messrs. Wakeley, Bros., London, for an exhibit of Daffodils, Tulips, Hyacinths, etc.

Selected for trial at Wisley

<i>Primula malacoides</i>	'Admiration.'	} from Messrs. Sutton & Sons, Ltd., Reading.
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"	"	
"	"	
"	"	

Other Exhibits

Polyanthus and coloured Primroses, from Mr. C. Newberry, Knebworth.

Primulas (hardy), from Miss M. Linton, Oxford.

FLORAL COMMITTEE B—Lord ABERCONWAY, C.B.E., V.M.H., in the Chair, and twenty-two other members present.

Awards Recommended :*Flora Medal*

To Messrs. J. Cheal & Sons, Ltd., Crawley, for an exhibit of rock garden plants and bulbs.

To Mr. K. W. Harle, Lower Basildon, for an exhibit of succulents.

To Orchard Neville Nurseries, Baltonsborough, for an exhibit of rock garden plants and bulbs.

Banksian Medal

To Messrs. Burkwood & Skipwith, Ltd., Kingston-on-Thames, for an exhibit of flowering shrubs.

To the Kew Topiary Nurseries, Richmond, for an exhibit of clipped Box trees.

To Mr. M. P. Kooper, Ferndown, for an exhibit of shrubs and rock garden plants.

To Messrs. M. Pritchard & Sons, Ltd., Christchurch, for an exhibit of rock garden plants and shrubs.

Other Exhibit

Shepherdia argentea, exhibited by the Director, Royal Botanic Gardens, Kew.

ORCHID COMMITTEE—Mr. GURNEY WILSON, F.L.S., V.M.H., in the Chair, and twelve other members present.

Awards Recommended :*Silver Flora Medal*

To Messrs. Stuart Low & Co., Jarvis Brook, for a group of Orchids.

To Messrs. Charlesworth & Co., Haywards Heath, for a group of Orchids.

To Messrs. Sanders, St. Albans, for a group of Orchids.

First-class Certificate

To *Laeliocattleya* 'Erato' (*Lc.* 'Aconcagua' × *Lc. Schroederae*) (votes 10 for, 0 against), from H. W. B. Schroder, Esq., Dell Park, Englefield Green.

Award of Merit

To *Cattleya Trianae* var. 'A. C. Burrage' (votes 9 for, 0 against), from H. W. B. Schroder, Esq., Dell Park, Englefield Green.

To *Cymbidium* 'Ulysses' (*Pauwelsii* × 'Hathor') (votes 8 for, 1 against), from Messrs. H. G. Alexander, Tetbury, Glos.

To *Odontonia* 'Mandania' var. 'Cathay' (*Oda.* 'Mandela' × *Odm.* 'Ascania') (votes 11 for, 0 against), from Messrs. Charlesworth & Co., Haywards Heath.

To *Cymbidium* 'Bullfinch' Exbury var. ('Garnet' × *Alexanderi*) (votes 11 for, 0 against), from Edmund de Rothschild, Esq., Exbury.

NARCISSUS AND TULIP COMMITTEE—Mr. E. A. BOWLES, F.L.S., F.R.E.S., V.M.H., in the Chair, and twelve other members present.

Awards Recommended :*Gold Medal*

To the Central Bulb Committee, Wilhelminastraat 13, Haarlem, Holland, for an exhibit of forced Daffodils and Tulips.

Silver Flora Medal

To the Trenoweth Valley Flower Farm, St. Keverne, Cornwall, for an exhibit of Daffodils and Tulips.

Silver Banksian Medal

To Messrs R. Wallace & Co., The Old Gardens, Tunbridge Wells, for an exhibit of Daffodils and Tulips.

Other Exhibits

Daffodils, shown by Messrs. G. Zandbergen-Terwegen, Sassenheim, Holland.

Narcissus dubius, shown by the Director, The Royal Horticultural Society's Gardens, Wisley.

JOINT ROCK GARDEN PLANT COMMITTEE—Col. F. C. STERN, O.B.E. M.C., F.L.S., V.M.H., in the Chair, and thirteen other members present.

Exhibit

Ramunculus calandrinoides (A.M. 1939), from the Director, R.H.S. Gardens, Wisley, Ripley, Surrey.

MARCH 16, 1948

SCIENTIFIC COMMITTEE—Mr. E. A. BOWLES, M.A., F.L.S., F.R.E.S. V.M.H., in the Chair, and seven other members present.

Acer.—A flowering specimen of an *Acer* sent by Mrs. Lindsay Smith was provisionally identified as *Acer rubrum* (an identification since confirmed by Dr. W. B. Turrill at Kew).

Diseased Tulip.—A diseased Tulip bulb shown by Mr. Edelsten was referred to Wisley [where it has been determined by Mr. D. E. Green as affected by shanking (*Phytophthora cryptogea*)].

Diseased Scilla.—Mr. F. G. Preston showed specimens of *Chionodoxa sardensis* with pollen replaced by the sooty spores of *Ustilago*.

Abnormal Bluebell.—Mr. H. M. Edelsten showed an abnormal elongated bulb of bluebell (*Scilla non-scripta*) in which a second shoot had pierced and emerged from the side of the sheath of the primary shoot.

FRUIT AND VEGETABLE COMMITTEE—Mr. F. A. SECRETT, C.B.E., F.L.S., V.M.H., in the Chair, and fifteen other members present.

Exhibits

Apple 'Tennant's Seedling,' from J. S. Tennant, Esq., St. John's, 74 West End Avenue, Harrogate, Yorks.

Apples 'Eynsham Russet,' 'Fred's Reward' and Seedling ('Cox' × 'May Queen'), from J. F. Wastie, Esq., Eynsham, Oxford.

Apple 'Kenneth,' from K. McCreadie, Esq., Parks Dept., Town Hall, Torquay.

Unknown Pear from W. B. Cranfield, Esq., East Lodge, Enfield Chase, Middlesex.

Apple 'Winston' from the National Fruit Trials, Wisley.

FLORAL COMMITTEE A—Mr. G. W. LEAK, V.M.H., in the Chair, and twelve, other members present.

Awards Recommended :

Silver-gilt Flora Medal

To Parigo Horticultural Co. Ltd., Spalding, for an exhibit of Freesias.

Silver-gilt Banksian Medal

To Messrs. Allwood Bros., Ltd., Haywards Heath, for an exhibit of Carnations.

Silver Flora Medal

To Messrs. Napier, Taunton, for an exhibit of Carnations.

Flora Medal

To Messrs. Biddlecombe Bros., Bracknell, for an exhibit of Carnations.

Banksian Medal

To Messrs. T. Carlile, Ltd., Twyford, for an exhibit of hardy Primulas.

To Messrs. M. P. Kooper & Son, Ferndown, for an exhibit of Daffodils, shrubs and other hardy plants.

To Mr. C. Newberry, Knebworth, for an exhibit of Polyanthus and coloured Primroses.

To Messrs. Toogood & Sons, Ltd., Southampton, for an exhibit of Cinerarias.

Award of Merit

To Hippeastrum W1/D8LF subject to naming, as a warm greenhouse flowering plant (votes 12 for, 0 against), from the Director, R.H.S. Gardens, Wisley, on behalf of A. C. Buller, Esq., Dwarsrivershoek, Stellenbosch, Cape Province, South Africa.

To Hippeastrum W3/DA subject to naming, as a warm greenhouse flowering plant (votes 11 for, 1 against), from the Director, R.H.S. Gardens, Wisley, on behalf of A. C. Buller, Esq., Dwarsrivershoek, Stellenbosch, Cape Province, South Africa.

To Hippeastrum W9/523KBIOE subject to naming, as a warm greenhouse flowering plant (votes 12 for, 0 against), from the Director, R.H.S. Gardens, Wisley, on behalf of A. C. Buller, Dwarsrivershoek, Stellenbosch, Cape Province, South Africa.

Selected for trial at Wisley

Primula 'Glasnevin hybrid' from Messrs. A. R. & K. M. Goodwin, Stocklands Estate, Bewdley, Worcs.

FLORAL COMMITTEE B—Lord ASERCONWAY, C.B.E., V.M.H., in the Chair, and twenty-four other members present.

Awards Recommended :

Silver-gilt Banksian Medal

To Six Hills Nursery, Stevenage, for an exhibit of alpine plants in pans.

To Messrs. J. Waterer, Sons & Crisp, Ltd., for an exhibit of rock garden plants and shrubs.

Flora Medal

To Mr. K. W. Harle, Lower Basildon, for an exhibit of succulents.

To Messrs. M. Prichard & Son, Ltd., Christchurch, for an exhibit of rock garden plants and shrubs.

To Messrs. Sale & Son, Wokingham, for an exhibit of rock garden plants and shrubs.

To Southern Growers, Ltd., Groombridge, for an exhibit of shrubs and bulbous plants.

Banksian Medal

To Messrs. Burkwood & Skipwith, Ltd., Kingston, for an exhibit of flowering shrubs.

To Kew Topiary Nurseries, Ltd., Richmond, for an exhibit of clipped box trees.

To Orchard Neville Nurseries, Ltd., Baltonsborough, for an exhibit of rock garden plants.

To Stocklands Estate, Bewdley, for an exhibit of rock garden plants.

To Mr. F. Street, Woking, for an exhibit of hardy Heaths and other flowering shrubs.

To Messrs. Toogood & Sons, Ltd., Southampton, for an exhibit of rock garden plants.

Award of Merit

To *Magnolia stellata rubra* as a hardy, flowering shrub (votes 15 for, 4 against), from Messrs. R. C. Nottcut, Ltd., Woodbridge.

To *Mahonia pinnata* as a hardy, flowering, evergreen shrub (votes 14 for, 7 against), from Dr. M. Amsler, Delmonden Manor, Hawkhurst.

To *Muscari moschatum flavum* as a hardy, flowering bulbous plant (votes unanimous), from E. B. Anderson, Esq., Russetings, Rickmansworth.

Other Exhibits

Acer rubrum, exhibited by Mrs. Lindsay Smith, Chilworth.

Anemone blanda var. *Ingrami* forma *rosea*, *A. pavonina* var. *purpureo-violacea*, *A. pavonina* var. *typica*, exhibited by Col. F. C. Stern, O.B.E., M.C., V.M.H., Goring-by-Sea.

Helleborus Kochii × *H. guttatus*, exhibited by G. P. Baker, Esq., Sevenoaks.

Primula × *hevensis*, exhibited by Carters Tested Seeds Ltd., Raynes Park.

Prostanthera incisa var. *rosea*, exhibited by Hon. Lewis Palmer, Sutton Scotney.

Prunus changyangensis, *Scilla bifolia* var. *rosea*, exhibited by Capt. Collingwood Ingram, Benenden.

ORCHID COMMITTEE—Mr. GURNEY WILSON, F.L.S., V.M.H., in the Chair, and thirteen other members present.

Awards Recommended :

Gold Medal

To Messrs. Sanders, St. Albans, for a group of Cymbidiums.

Silver Flora Medal

To Messrs. Charlesworth & Co., Haywards Heath, for a group of Orchids.

To Messrs. Stuart Low & Co., Jarvis Brook, for a group of Orchids.

Award of Merit

To *Brassocattleya* 'Roger Sander' (C. 'Omar' × *Bc. Vilmoriniana*) (votes 11 for, 0 against) from Messrs. Sanders, St. Albans.

To *Cymbidium* × 'Flare' ('Edzell' × 'Rio-Rita') (votes 10 for, 0 against), from H. W. B. Schroder, Esq., Dell Park, Englefield Green.

To *Cymbidium* 'Irish Melody' (parentage unrecorded) (votes 10 for, 0 against), from A. Congreve, Esq., Winkfield Manor, Ascot.

To *Cymbidium* 'Adele Sander' var. 'Gold' ('St. Alban' × *Alexanderi*) (votes 7 for, 3 against), from Messrs. Sanders, St. Albans.

To *Cymbidium* 'Aton,' Westonbirt var. ('Baldur' × 'Pearl') (votes 12 for, 0 against), from Messrs. H. G. Alexander, Tetbury, Glos.

Preliminary Commendation

To *Odontoglossum* 'Crispatrium' (*crispum* × *Natrium*) (votes 70 for, 0 against), from Messrs. Charlesworth & Co., Haywards Heath.

Cultural Commendation

To Messrs. Sanders, St. Albans, for a vigorous plant of *Chysis bracteescens* bearing ten wax-like flowers.

NARCISSUS AND TULIP COMMITTEE—Mr. E. A. BOWLES, F.L.S., F.R.E.S., V.M.H., in the Chair, and sixteen other members present.

Awards Recommended :*Silver-gilt Banksian Medal*

To Messrs. Barr & Sons, 13, King Street, Covent Garden, London, W.C. 2, for an exhibit of Daffodils.

To Messrs. The Trenoweth Valley Flower Farm, St. Keverne, Cornwall, for an exhibit of Daffodils.

Silver Lindley Medal

To Mr. Alec Gray, Treswithian Daffodil Farm, Camborne, for an exhibit of Miniature Daffodils.

Silver Flora Medal

To Messrs. R. Wallace & Co., The Old Gardens, Tunbridge Wells, for an exhibit of Daffodils and Tulips.

Silver Banksian Medal

To Mr. J. O. Sherrard, The Old Rectory, Shaw, Newbury, for an exhibit of Daffodils. To Messrs. Wakeley Bros. & Co., Ltd., North Mymms, Hatfield, for an exhibit of Daffodils and Tulips.

Flora Medal

To Messrs. W. A. Constable, Ltd., Southborough, Tunbridge Wells, for an exhibit of Daffodils and Tulips.

Other Exhibits

Daffodils, shown by M. P. Williams, Esq., M.B.E., Lanarth, St. Keverne, Cornwall. *Narcissus* 'Goring,' shown by Colonel F. C. Stern, F.L.S., V.M.H., Highdown, Goring-by-Sea.

Narcissus 'Tresamble,' shown by Messrs. R. Wallace & Co.

JOINT ROCK GARDEN PLANT COMMITTEE—Col F. C. STERN, O.B.E. M.C., F.L.S., V.M.H., in the Chair, and ten other members present.

Awards Recommended :*Award of Merit*

To × *Saxifraga Biasolettii* var. 'Crystalie' (*S. Grisebachii* × *S. thessalica*) as a flowering and foliage plant for the Alpine House and Rock Garden, from G. P. Baker, Esq., Hillside, Oakhill Rd., Kippington, Sevenoaks.

Cultural Commendation

To Mr. H. Shanahan, 105 Wickenden Rd., Sevenoaks, alpine gardener to G. P. Baker, Esq., for the above pan of Sax. 'Crystalie.'

APRIL 6, 1948

SCIENTIFIC COMMITTEE—Mr. E. A. BOWLES, M.A., F.L.S., F.R.E.S., V.M.H., in the Chair, and six other members present.

Virescent Primulas.—Mr. H. Denniford sent several plants of *Primula denticulata* with virescent flowers, together with one virescent plant of *P. frondosa*. It was suggested that the virescence of these specimens might be a nutritional disorder and that the soil in which they are growing should be analysed.

New Liliaceous Plant from Manipur.—The Director of the R.H.S. Gardens, Wisley, showed three flowering specimens of a new liliaceous plant raised from seed (K. W. 16008) collected in Manipur on Mount Sirhoi by F. Kingdon-Ward in 1946, and now flowering for the first time. The plant had the general appearance of a small white-flowered *Nomocharis*, although the filaments were completely subulate, the perianth-segments entire. Mr. W. T. Stearn stated that Mr. J. R. Sealy of Kew, to whom the investigation of the plant had been referred by Mr. D. Wilkie of Edinburgh, had been in touch with him regarding its generic position and a joint paper was being prepared for the R.H.S. JOURNAL. The genus *Nomocharis* as accepted by Balfour and Evans

seemed distinguishable from *Lilium* only on the form of the nectary; the original stamen and perianth characters used by Franchet had been discarded owing to the discovery of intermediate species. Ward's plant had a nectary typical of *Lilium*. It was possible certain plants now referred to *Nomocharis* sect. *Ecristata* would also have to be placed in *Lilium*. Ward's plant was very closely allied to *Lilium sempervivoides*, which had never been placed in any genus but *Lilium*, though it showed affinity with *Nomocharis Henrici*, which might, however, be considered a species of *Lilium*. This matter was being investigated by Mr. Sealy. On all technical grounds Ward's plant had to be placed in *Lilium* as now accepted rather than in *Nomocharis*. The definition of these genera was necessarily somewhat arbitrary, as Mr. Edgar Evans had pointed out. The Chairman noted the slightly gibbous base of the outer perianth-segments, which suggested *Fritillaria*, and thanked the Director of the R.H.S. Gardens for making this interesting plant available for the Committee's examination.

Lilac for identification—A small pot-grown lilac shown by Mrs. Nigel Law was identified as *Syringa microphylla*.

Betula Maximowicziana—Specimens of *Betula Maximowicziana*, a species remarkable for the length of its catkins (up to 5½ inches long), were shown by Mr. J. B. Stevenson.

Germination of Lilium Martagon album—Mr. W. T. Stearn showed a glass storage jar filled with medium grade moist vermiculite in which seed of *Lilium Martagon album* had been sown on January 5, 1948. This had been kept at a temperature of about 70° F. for six weeks, during which time roots and bulblets had developed. It was then placed in a refrigerator for six weeks at 40° F. A week after removal to room temperature shoots had begun to develop on the seedlings. No shoots had yet appeared on control seedlings not subjected to cold storage.

FRUIT AND VEGETABLE COMMITTEE—Mr. F. A. SECRETT, C.B.E., F.L.S., V.M.H., in the Chair, and fourteen other members present.

Selected for trial at Wisley

Seedling Pear. from W. B. Cranfield, Esq., East Lodge, Enfield Chase, Middlesex.

FLORAL COMMITTEE A—Mr. W. AUSTIN in the Chair, and fifteen other members present.

Awards Recommended :

Silver-gilt Banksian Medal

To Messrs. Allwood Bros., Ltd., Haywards Heath, for an exhibit of Carnations.

Silver Flora Medal

To Messrs. Napier, Taunton, for an exhibit of Carnations.

Silver Banksian Medal

To Messrs. Blackmore & Langdon, Bath, for an exhibit of Polyanthus.

To Messrs. C. Engelman, Ltd., Saffron Walden, for an exhibit of Carnations.

Flora Medal

To Messrs. Allwood Bros., Ltd., Haywards Heath, for an exhibit of Dianthus.

To Messrs. Biddlecombe Bros., Bracknell, for an exhibit of Carnations and Polyanthus.

Banksian Medal

To Mr. C. Newberry, Knebworth, for an exhibit of Polyanthus and coloured Primroses.

To Messrs. Toogood & Sons, Ltd., Southampton, for an exhibit of Cinerarias.

To Messrs. Wheatcroft Bros., Nottingham, for an exhibit of Roses.

Selected for trial at Wisley

Primula denticulata 'George Welch,' from Mr. G. E. Welch, Cambridge.

Other Exhibits

Primula 'Heather Claire,' from Mr. G. Depledge, Pontefract.

Primula 'Lorna Doone,' from Messrs. M. Prichard & Sons, Ltd., Christchurch.

FLORAL COMMITTEE B—Lord ABERCONWAY, C.B.E., V.M.H., in the Chair, and twenty other members present.

Awards Recommended :

Silver-gilt Banksian Medal

To Messrs. Hillier & Son, Winchester, for an exhibit of flowering trees and shrubs.

To Messrs. L. R. Russell, Ltd., Windlesham, for an exhibit of flowering trees and shrubs.

To Messrs. J. Waterer, Sons & Crisp, Ltd., for an exhibit of Japanese Cherries.

Silver Flora Medal

To Winkfield Manor Nurseries, Ascot, for an exhibit of rock garden plants.

To Winkfield Manor Nurseries, Ascot, for an exhibit of flowering trees and shrubs.

Flora Medal

To Messrs. Burkwood & Skipwith, Ltd., Kingston-on-Thames, for an exhibit of flowering shrubs.

To Mr. K. W. Harle, Lower Basildon, for an exhibit of succulents.

To Messrs. M. Prichard & Son, Ltd., Christchurch, for an exhibit of rock garden plants and shrubs.

To Messrs. Sale & Son, Wokingham, for an exhibit of rock garden plants and shrubs.

To Messrs. J. Waterer, Sons & Crisp, Ltd., Twyford, for an exhibit of rock garden plants.

To Mr. G. Welch, Cambridge, for an exhibit of rock garden plants.

Banksian Medal

To Messrs. Feilden & Crouch, Wrotham, for an exhibit of rock garden plants.

To the Kew Topiary Nurseries, Richmond, for an exhibit of clipped box trees.

To Mr. W. Kibble, Bagshot, for an exhibit of rock garden plants.

To Old Welwyn Gardens, Welwyn, Herts, for an exhibit of rock garden plants.

To Orchard Neville Nurseries, Baltonsborough, for an exhibit of rock garden plants.

To Messrs. Toogood & Son, Southampton, for an exhibit of rock garden plants.

Award of Merit

To *Chaenomeles lagenaria* 'Knap Hill Radiance' as a hardy flowering shrub (votes 13 for, 0 against), from Knap Hill Nursery, Ltd., Woking.

To *Camellia japonica* 'Mercury' as a hardy flowering shrub (votes unanimous), from E. de Rothschild, Esq., Exbury, Southampton.

To *Ipheion uniflorum* as a hardy flowering herbaceous plant (votes 13 for, 0 against), from the Director, R.H.S. Gardens, Wisley, and W. T. Stearn, Esq., 217 Mortlake Road, Kew.

To *Magnolia Kobus* var. *borealis* as a hardy flowering tree (votes 12 for, 2 against), from Sir Henry Price, Wakehurst Place, Ardingly.

To *Magnolia Sprengeri* *diva* 'Wakehurst Seedling' as a hardy flowering tree (votes unanimous), from Sir Henry Price, Wakehurst Place, Ardingly.

Other Exhibits

Anemone Pulsatilla 'Prichards' Treasure,' exhibited by Messrs. Maurice Prichard & Sons, Ltd., Christchurch.

Betula Maximowicziana, exhibited by J. B. Stevenson, Esq., V.M.H., Ascot.

Camellias, *Lathraea clandestina*, exhibited by Dr. M. Amsler, Hawkhurst.

Camellia Nagasaki, *Citrus trifoliata*, *Clivia kewensis* *Bodnant Variety*, *Magnolia Sprengeri* var. *diva* seedling, exhibited by Lord Aberconway, C.B.E., V.M.H., Bodnant.

Leucojum aestivum 'Gravetye' Variety, exhibited by Col. F. C. Stern, O.B.E., M.C., Goring-by-Sea.

Mahonia pinnata, exhibited by Knap Hill Nursery, Ltd., Woking.

Malus baccata, exhibited by The Director, Royal Botanic Gardens, Kew.

Nomocharis sp. K.W. 16008, exhibited by The Director, R.H.S. Gardens.

Prunus japonica var. *Nakaii*, *P. Padus* var. *commutata*, *P. Schmittii*, exhibited by Capt. Collingwood Ingram, Benenden.

Prunus 'Pink Perfection,' exhibited by Waterer Sons & Crisp, Ltd., Bagshot.

Syringa microphylla, exhibited by Mrs. Nigel Law, Chalfont St. Peter.

NARCISSUS AND TULIP COMMITTEE—Mr. E. A. BOWLES, F.L.S., F.R.E.S., V.M.H., in the Chair, and nineteen other members present. Group Captain C. O. Fairbairn of Victoria, Australia, was present as a visitor.

Awards Recommended :*Silver-gilt Flora Medal*

To Messrs. Barr & Sons, 13 King Street, Covent Garden, London, W.C. 2., for an exhibit of Daffodils.

To Mr. W. J. Dunlop, Dunrobin, Ballymena, N. Ireland, for an exhibit of Daffodils.

To Mr. J. L. Richardson, Prospect House, Waterford, for an exhibit of Daffodils.

Silver-gilt Banksian Medal

To Messrs. Walter Blom & Son, Coombelands Nurseries, Leavesden, Watford, for an exhibit of Daffodils.

To Mr. Raymond Perks, Berrow, Burnham-on-Sea, Somerset, for an exhibit of Daffodils.

To the Trenoweth Valley Flower Farm, St. Keverne, Cornwall, for an exhibit of Daffodils.

Silver Lindley Medal

To C. F. Coleman, Esq., Broomhill, Cranbrook, Kent, for an exhibit of seedling Daffodils raised by crossing *Narcissus cyclamineus* and *N. 'Mitylene.'*

Silver Flora Medal

To Messrs. J. R. Pearson & Sons, Lowdham, Notts., for an exhibit of Daffodils.

Silver Banksian Medal

To Messrs. Partridge & Lower, Eastdon House, Starcross, Devon, for an exhibit of Daffodils.

To Mr. J. O. Sherrard, The Old Rectory, Shaw, Newbury, for an exhibit of Daffodils.
To Messrs. R. Wallace & Co., The Old Gardens, Tunbridge Wells, for an exhibit of Daffodils and Tulips.

Flora Medal

To F. E. Gibbs, Esq., Little Dawley, Hayes, Middlesex, for an exhibit of seedling Daffodils.

Banksian Medal

To Messrs. M. P. Kooper & Son, Muirfield, Victoria Road, Ferndown, Dorset, for an exhibit of Daffodils.

To Messrs. Wakeley Bros. & Co. Ltd., Dixon's Hill Nursery, North Mimms, Herts., for an exhibit of Daffodils and Tulips.

First Class Certificate

To *Narcissus 'Ceylon'* as a variety for exhibition (voting unanimous). This brilliantly coloured "red and yellow" *Incomparabilis* variety (Division 2A) received an *A.M.* on March 26, 1946. (See JOURNAL, 71. 205.) Raised and shown by Mr. J. L. Richardson.
To *Narcissus 'Galway'* as a variety for exhibition (voting unanimous). This refined yellow *Incomparabilis* variety (Division 2A) received an *A.M.* on April 14, 1942. (See JOURNAL 68. 277.) Raised and shown by Mr. J. L. Richardson.

Award of Merit

To *Narcissus 'Bahram'* as a variety for exhibition (voting unanimous.) Raised and shown by Mr. J. L. Richardson.

To *Narcissus 'Charity May'* as a variety for exhibition (votes 11 for, 0 against). Raised and shown by C. F. Coleman, Esq.

To *Narcissus 'Farewell'* as a variety for exhibition (voting unanimous). Raised and shown by M. P. Williams, Esq., M.B.E., Lanarth, St. Keverne, Cornwall.

To *Narcissus 'Freia'* as a variety for exhibition (votes 14 for, 2 against). Raised and shown by Norman F. Lock, Esq., F.R.C.S., 5 Barnfield Crescent, Exeter.

To *Narcissus 'Jenny'* as a variety for exhibition (voting unanimous.) Raised and shown by C. F. Coleman, Esq.

To *Narcissus 'Kilmorna'* as a variety for exhibition (votes 13 for, 0 against). Raised and shown by Mr. J. L. Richardson.

Variety selected for trial

Narcissus 'Farewell,' shown by M. P. Williams, Esq., M.B.E., was selected for trial at Wisley as a variety for garden decoration.

Other Exhibits

Narcissus cystettensis, shown by George M. Taylor, Esq., Links Cottage, Longniddry, East Lothian. This was the old "Queen Anne's Double Daffodil," named after Anne of Austria who married King Louis XIII of France, in 1615, and not, as has been commonly supposed, after Queen Anne of England.

Tulipa praecox, shown by Colonel F. C. Stern, O.B.E., M.C., F.L.S., V.M.H., Highdown, Goring-by-Sea.

Tulip trial at Wisley

The following awards were recommended to varieties and hybrids of *Tulipa Kaufmanniana* in accordance with the report of the Sub-Committee which inspected the Trial at Wisley on March 24 and April 5.

First Glass Certificate

To Tulipa 'Josef Kafka.'

Award of Merit

To Tulipa 'Lady Rose,' 'Fritz Kreisler,' 'Henriette,' 'Solanus,' 'Kaufmanniana coccinea,' 'Robert Schumann,' 'Bellini,' 'Vivaldi,' 'Corona.'

Highly Commended

To Tulipa 'Edwin Fischer,' 'Alfred Cortot.'

All the above-mentioned Tulips were sent by Messrs. C. G. van Tubergen, Ltd., Haarlem, Holland, except 'Robert Schumann,' which was sent by Messrs. R. Wallace & Co.

Extracts from THE PROCEEDINGS OF THE ROYAL HORTICULTURAL SOCIETY

GENERAL MEETINGS

MARCH 23, 1948

JOINT ROCK GARDEN PLANT COMMITTEE—Col. F. C. STERN, O.B.E., M.C., F.L.S., V.M.H., in the Chair and six other members present.

Awards Recommended :

Award of Merit

To *Salix apoda* (male form) as a flowering plant for the Rock Garden or Alpine House from Messrs. W. E. Th. Ingwersen, Ltd., Birch Farm Nurseries, Gravetye, East Grinstead, Sussex.

Cultural Commendation

To Mr. S. J. Marsh, Nutley, Sussex, for a fine plant of *Kelseya uniflora* exhibited by the grower.

To Mr. A. Branch c/o Shipton-on-Cherwell Nurseries, Kidlington, Oxon., for an outstanding specimen of *Acantholimon Hohenackeri* exhibited by the Shipton-on-Cherwell Nurseries.

Other Exhibit

× *Saxifraga Boeckeleri* from Mr. John Burgess, 87 Ethelbert Avenue, Southampton.

APRIL 6, 1948

ORCHID COMMITTEE—Mr. GURNEY WILSON, F.L.S., V.M.H., in the Chair, and twelve other members present.

Awards Recommended :

Gold Medal

To Guy P. Harben, Esq., Colbury House, Calmore, Hants., for an extensive group of choice Cymbidiiums.

Silver Flora Medal

To Messrs. Charlesworth & Co., Haywards Heath, for a group of Orchids.

To Messrs. Stuart Low & Co., Jarvis Brook, for a group of Orchids.

Award of Merit

To *Cymbidium* 'Icarus' Exbury var. (*Pauwelsii* × 'Apollo') (votes 11 for, 0 against), from E. de Rothschild, Esq., Exbury, Hants.

To *Cymbidium* 'Bodmin Moor' var. 'Catherine Armstrong' (*Alexanderi* × 'Erica Sander'), (votes 10 for, 0 against), from Mr. Clint McDade, Chattanooga, Tennessee, U.S.A.

To *Odontoglossum* 'Bassanio' Ashcroft var. (*Lawrenceanum* × 'Burie') (votes 10 for, 0 against), from Mr. S. Farnes, East Grinstead.

To *Odontonia* 'Paulina' (*Odontonia* 'Duchess of York' × *Miltonia* 'William Pitt') (votes 8 for, 2 against), from Messrs. Charlesworth & Co., Haywards Heath.

To *Odontioda* 'Hawfinch' Wyld Court var. (*Oda*. 'Helma' × *Odm*. 'Brimstone Butterfly') (votes 11 for, 0 against), from Sir William Cooke, Bt., Wyld Court, Hampstead Norris.

To *Wilsonara* 'Lyoth' var. 'Ruby' (*Oda*. 'Venusta' × *Onc*. *Claesianum*) (votes 8 for, 2 against), from Messrs. Charlesworth & Co., Haywards Heath.

RHODODENDRON COMMITTEE—Mr. J. B. STEVENSON, V.M.H., in the Chair, and eighteen other members present.

Awards Recommended:

Award of Merit

To × *Rhododendron Spinulosum* var. 'Exbury' (*R. spinuliferum* × *R. racemosum*) (votes 11 for, 0 against), as a hardy flowering shrub from E. de Rothschild, Esq.

To × *Rhododendron* 'Bartia' (*R. Barclayi* × *R. 'Portia'*, F.C.C.) (votes 9 for, 0 against), as a hardy flowering shrub, from Lord Aberconway, Bodnant, North Wales.

To × *Rhododendron* 'Diane' (parentage unknown) (votes 9 for, 0 against), as a hardy flowering shrub after trial at Wisley, from Messrs. M. Koster & Sons, Ltd., Nurserymen, Boskoop, Holland.

Other Exhibits

Rhododendron flavidum var. *album*, × *Rhododendron* 'Mariloo' var. 'Eugenie' (R. 'Dr. Stocker' × *R. lacteum*), × *Rhododendron* 'Avalanche' var. 'Alpine Glow' (A.M. 1938) (*R. Loderi* × *R. calophytum*), *Rhododendron Smithii* and *Rhododendron spiciferum* from E. de Rothschild, Esq.

× *Rhododendron* 'Apis' (*R. bullatum* × *R. Nuttallii*) and × *Rhododendron* 'Dr. J. Hutchinson' (*R. Taggianum* × *R. Nuttallii*), from Col. S. R. Clarke, C.B., Borde Hill, Haywards Heath, Sussex.

Rhododendron Albrechtii, × *R.* 'Beauty of Tremough' var. 'Bodnant' (*R. arboreum* × *R. Griffithianum*) and *R. calophytum*, pink form, from Lord Aberconway.

× *Rhododendron* 'Diane' (parentage unknown) × *R. Luscombei* (*R. Fortunei* × *R. Thompsonii*), *R. pubescens*, and *R. canadense*, from the Knaphill Nursery, Ltd., Woking, Surrey.

× *Rhododendron* 'Red Crown' (*R. Thompsonii* × *R. Loderi*), from M. Haworth-Booth, Esq., Farall, Haslemere.

JOINT ROCK GARDEN PLANT COMMITTEE—IRIS LADY LAWRENCE, V.M.H., in the Chair, and eight other members present.

Awards Recommended :*Award of Merit*

To *Doronicum cordifolium* as a hardy flowering plant for the rock garden, from Messrs. W. E. Th. Ingwersen, Ltd., Birch Farm Nurseries, Gravetye, East Grinstead, Sussex.

APRIL 13, 1948

NARCISSUS AND TULIP COMMITTEE—Mr. E. A. BOWLES, F.L.S., F.R.E.S., V.M.H., in the Chair, and twenty-six other members present. Group Capt. C. O. Fairbairn, of Victoria, Australia, was present as a visitor.

Awards Recommended:*Gold Medal*

To Mr. J. L. Richardson, Prospect House, Waterford, for an exhibit of Daffodils.

To Mr. Guy L. Wilson, The Knockan, Broughshane, Co. Antrim, for an exhibit of Daffodils.

Silver-gilt Flora Medal

To Messrs. Barr & Sons, 13 King Street, Covent Garden, London, W.C. 2, for an exhibit of Daffodils.

To Mr. W. J. Dunlop, Dunrobin, Ballymena, N. Ireland, for an exhibit of Daffodils.

Silver-gilt Banksian Medal

To Messrs. The Sieve Donard Nursery Co., Ltd., Newcastle, Co. Down, for an exhibit of Daffodils.

To Messrs. The Trenoweth Valley Flower Farm, Ltd., St. Keverne, Cornwall, for an exhibit of Daffodils.

Silver Flora Medal

To Messrs. Walter Blom & Son, Ltd., Coombelands Nurseries, Leavesden, Watford, Herts., for an exhibit of Daffodils.

To Mr. J. O. Sherrard, The Old Rectory, Shaw, Newbury, for an exhibit of Daffodils.

To Messrs. J. R. Pearson & Sons, Ltd., Lowdham, Notts., for an exhibit of Daffodils.

Silver Banksian Medal

To Messrs. Partridge & Lower, Eastdon House, Starcross, Devon, for an exhibit of Daffodils.

Lindley Medal

To Mr. Alec Gray, Treswithian Daffodil Farm, Camborne, Cornwall, for an exhibit of Miniature Daffodils.

Flora Medal

To F. E. Gibbs, Esq., Little Dawley, Hayes, Middlesex, for an exhibit of Daffodils.

To Messrs. M. P. Kooper & Son, Muirfield, Victoria Road, Ferndown, Dorset, for an exhibit of Daffodils.

To Messrs. G. Lubbe & Son, Terweeweg 152, Oegatgeest, Holland, for an exhibit of Daffodils.

Award of Merit

To *Narcissus* 'Killaloe' as a variety for exhibition (votes 19 for, 0 against). This variety, which received a P.C. on April 16, 1940, was raised and shown by Mr. J. L. Richardson.

To *Narcissus* 'Preamble' as a variety for exhibition (votes 19 for, 0 against). Raised and shown by Mr. Guy L. Wilson.

To *Narcissus* 'Spellbinder' as a variety for exhibition (votes 14 for, 7 against). Raised and shown by Mr. Guy L. Wilson.

Preliminary Commendation

To *Narcissus* 'Signal Light' (Division 2b).

To *Narcissus* 'Blarney's Daughter' (Division 2b).

To *Narcissus* 'Salmon Trout' (Division 4a).

All three of these varieties were raised and shown by Mr. J. L. Richardson.

To *Narcissus* 'Brookfield' (Division 4a), raised and shown by Mr. W. J. Dunlop.

Variety selected for Trial

Narcissus 'Red Goblet,' shown by Mr. J. L. Richardson, was selected for trial at Wisley as a variety for garden decoration.

Other Exhibits

Narcissus 'Yellow Jacket,' shown by Mr. C. A. Jardine, 45 Percival Road, Feltham, Middlesex.

Narcissus 'Monty,' shown by Colonel F. C. Stern, O.B.E., M.C., F.L.S., V.M.H.

Narcissus 'Missouri,' shown by Messrs. G. Zandbergen-Terwegen, Sassenheim, Holland.

Narcissus 'Golden Torch' and *N.* 'Zero,' shown by Mr. Guy L. Wilson.

The Peter Barr Memorial Cup

It was unanimously recommended that the Peter Barr Memorial Cup, which is awarded annually to someone who has done good work on behalf of the Daffodil, be awarded for 1948 to Mr. Alister Clark, Glenara, Bulla, Victoria, in recognition of his outstanding work in raising new varieties and in helping over many years to popularize Daffodils in Australia.

APRIL 20, 1948

SCIENTIFIC COMMITTEE—Mr. E. A. BOWLES, M.A., F.L.S., F.R.E.S., V.M.H., in the Chair, and seven other members present.

Plants for Identification—Specimens received from Mrs. C. Mayne were identified as *Lysichitum americanum*, *Malus* possibly *M. × purpurea*, *Rhododendron obtusum* var. *amoenum*, *Anemone nemorosa* var. *multiplax*, a double variety with petaloid carpels. The Committee was unable to identify a flowerless specimen of a plant raised from seed brought from Durban by Mr. S. E. A. Johnson, but suggested that it might belong to the family Zingiberaceae.

***Narcissus* Hybrid**—Mr. H. M. Edelsten showed a specimen of a hybrid *Narcissus* which he had raised about thirty years ago by crossing *N. Bulbocodium citrinus* (female) with *N.* 'Madame de Graaff.' It grew about a foot high and had a pale yellow flower, with the tube about 2 cm. long, the spreading narrowly triangular segments 3.5 cm. long, the gradually expanded corona 3 cm. long and 3.5 cm. in diameter at the mouth, the dehiscent anthers about 1.3 cm. long. While in general character like 'Madame de Graaff,' it also showed characteristics derived from *N. Bulbocodium citrinus*.

Grasses on steep slopes—Methods of controlling the growth of grass on steep slopes around a South African gold mine were discussed. Mr. Moseley suggested enquiry into the use of coal-tar derivatives.

Unusual behaviour of Daffodils—The Committee declined to express any opinion on the cause of the reputed change of colour in certain forced Daffodils which was described in a letter from Mrs. G. Newcombe.

FRUIT AND VEGETABLE COMMITTEE—Mr. J. M. S. POTTER in the Chair, and eight other members present.

Exhibits

Group of Strawberries from Mr. H. S. Melbourn, Pinetree Fruit Farm, Cranborne, Wimborne, Dorset.

Apple 'Wellhead Wonder,' from Messrs. S. Aish & Son, Cissbury Nurseries, Borough Road, Dunstable, Beds.

FLORAL COMMITTEE A—Mr. G. W. LEAK, V.M.H., in the Chair, and eleven other members present.

Awards Recommended:**Silver Flora Medal**

To Messrs. Allwood Bros., Ltd., Haywards Heath, for an exhibit of Carnations and various *Dianthus*.

Silver Banksian Medal

To Messrs. Napier, Taunton, for an exhibit of Carnations.

Flora Medal

To Messrs. Biddlecombe Bros., Bracknell, for an exhibit of Carnations.
To Plant Protection Ltd., Fernhurst, for an exhibit of Cinerarias.
To Messrs. Ed. Webb & Sons (Stourbridge), Ltd., Stourbridge, for a group of Cinerarias.

Banksian Medal

To the Golden Valley Nurseries, Brimscombe, for an exhibit of Viola 'Blue Carpet.'

Other Exhibits

Geum 'Ethel Bennell,' from Mr. G. F. Bennell, Bushy Heath.
Primula acaulis 'E. M. Barnes,' 'Royalty' and 'Springtime,' from Mr. A. T. Barnes, Bedford.
Roses from Messrs. Wheatcroft Bros., Ruddington, Nottingham.

FLORAL COMMITTEE B—Lord ABERCONWAY, C.B.E., V.M.H., in the Chair, and twenty-three other members present.

Awards Recommended:

Silver-gilt Flora Medal

To Messrs. J. Waterer, Sons & Crisp, Ltd., Bagshot, for an exhibit of Japanese Cherries.

Silver-gilt Banksian Medal

To Messrs. Hillier & Sons, Ltd., Winchester, for an exhibit of flowering trees and shrubs.

Silver Flora Medal

To Winkfield Manor Nurseries, Ascot, for an exhibit of rock garden plants.

Silver Banksian Medal

To Messrs. Burkwood & Skipwith, Ltd., Kingston, for an exhibit of flowering shrubs.
To Messrs. J. Cheal & Son, Ltd., Crawley, for an exhibit of flowering trees and shrubs.
To Messrs. L. R. Russell, Ltd., Windlesham, for an exhibit of flowering trees and shrubs.

Flora Medal

To Mr. K. W. Harle, Lower Basildon, for an exhibit of succulents.
To Messrs. W. E. Th. Ingwersen, Ltd., East Grinstead, for an exhibit of Primulas and other alpine plants.
To Mr. W. Kibble, Bagshot, for an exhibit of rock garden plants.
To Messrs. J. Waterer, Sons & Crisp, Ltd., Twyford, for an exhibit of rock garden plants.
To Mr. Geo. Welch, Cambridge, for an exhibit of rock garden plants.

Banksian Medal

To Messrs. Hale and May, Ltd., Cookham, for an exhibit of rock garden plants.
To The Kew Topiary Nursery, Richmond, for an exhibit of clipped Box trees.
To Orchard Neville Nurseries, Baltonsborough, for an exhibit of rock garden plants.
To Messrs. M. Prichard & Son, Christchurch, for an exhibit of rock garden plants.
To Messrs. Sale & Son, Ltd., Wokingham, for an exhibit of rock garden plants.
To Mr. S. Sims, Draycott, for an exhibit of rock garden plants.
To Mr. F. Street, Woking, for an exhibit of flowering shrubs.

Award of Merit.

To *Muscari armeniacum ramosum*, as a hardy flowering herbaceous plant (votes 14 for, 6 against), from Messrs. R. Wallace & Co., Tunbridge Wells.
To *Prunus avium grandiflora*, as a hardy, flowering tree (votes 11 for, 4 against), from Messrs. J. Waterer, Sons & Crisp, Ltd., Bagshot.
To *Richardia Rehmannii*, dark form, as a flowering plant for the greenhouse (votes 11 for, 5 against), from the Director, R.H.S. Gardens, Wisley.

Other Exhibits

Acer diabolicum purpurascens, exhibited by Capt. Collingwood Ingram, Benenden.
Camellia japonica var. 'Jupiter,' exhibited by Hillier & Sons, Winchester.
Chaenomeles lagenaria var., exhibited by H. R. Tuffin, Esq., Taunton.
Euphorbia characias, *Viburnum fuddii*, exhibited by The Director, Wisley.
Yasminum polyanthum, exhibited by The Hon. Mrs. Guy Baring, Liss.
Kalanchoe grandiflora, exhibited by Mrs. Vera Higgins, Croydon.
Leucosium aestivum, exhibited by The Director, Cambridge Botanic Gardens.
Prunus avium fl. pl., exhibited by Messrs. J. Waterer, Sons & Crisp, Ltd., Bagshot.
Tritonia sp., exhibited by G. E. Whitehead, Esq., Pulborough.

Extracts from THE PROCEEDINGS OF THE ROYAL HORTICULTURAL SOCIETY

GENERAL MEETINGS

APRIL 20, 1948

ORCHID COMMITTEE—Mr. GURNEY WILSON, F.L.S., V.M.H., in the Chair, and nine other members present.

Awards Recommended:

Silver Flora Medal

Messrs. Charlesworth & Co., Haywards Heath, for a group of Orchids.

Messrs. Stuart Low & Co., Jarvis Brook, for a group of Orchids.

First-Class Certificate

Odontonia 'Golden Ray' (*O. 'Ophelia'* × *Odontoglossum 'Gold Star'*) (votes 6 for, 2 against), from Messrs. Charlesworth & Co., Haywards Heath.

Award of Merit

Cymbidium 'Herdsmen' (parentage unrecorded) (votes 8 for, 0 against), from Sir Harrison Hughes, Eddington House, Hungerford.

NARCISSUS AND TULIP COMMITTEE—Mr. E. A. BOWLES, F.L.S., F.R.E.S., V.M.H., in the Chair, and eight other members present.

Awards Recommended:

Gold Medal

To Mr. J. L. Richardson, Prospect House, Waterford, for an exhibit of Daffodils.

Silver Flora Medal

To Messrs. The Trenoweth Valley Flower Farm, Ltd., St. Keverne, Cornwall, for an exhibit of Daffodils.

To Messrs. R. Wallace & Co., The Old Gardens, Tunbridge Wells, for an exhibit of Tulips and Daffodils.

Silver Banksian Medal

To Messrs. Partridge & Lower, Eastdon House, Starcross, Devon, for an exhibit of Daffodils.

To Messrs. Wakeley Bros. & Co., Ltd., Dixon's Hill Nursery, North Mimms, for an exhibit of Tulips and Daffodils.

Banksian Medal

To Messrs. M. P. Kooper & Son, Muirfield, Victoria Road, Ferndown, Dorset, for an exhibit of Daffodils.

Award of Merit

To *Narcissus 'Nairobi'* as a variety for exhibition (votes 6 for, 2 against). Raised and shown by Mr. J. L. Richardson.

To *Tulipa 'Galita'* (votes unanimous). Raised by Mr. D. W. Lefebvre and shown by Messrs. R. Wallace & Co.

Preliminary Commendation

To *Tulipa* 'Chairman Bowles,' a very attractive hybrid of *Tulipa Kaufmanniana*, with a flower about 4 inches long borne on a 15-inch stem. The ground colour was cream the outer segments having a central splash of red. The inside of each of the segments had a red blotch just above the yellow base. Raised by Messrs. C. G. van Tubergen, Ltd., and shown by Messrs. R. Wallace & Co.

Plants to be seen again

The Committee expressed a desire to see the undermentioned plants at a future meeting.

Narcissus 'Rosario,' shown by Mr. Guy L. Wilson, The Knockan, Broughshane, Co. Antrim.

Tulipa 'Anjou,' shown by Messrs. R. Wallace & Co.

Other Exhibits

Narcissus 'Mahmoud,' *N.* 'Killaloe,' *N.* 'Corofin' and *N.* 'Innisfallen,' shown by Mr. J. L. Richardson.

RHODODENDRON COMMITTEE—Mr. J. B. STEVENSON, V.M.H., in the Chair, and fourteen other members present.

Awards Recommended:

First-Class Certificate

To *× Rhododendron* 'Gladys' var. 'Letty Edwards' (*R. campylocarpum* *× R. Fortunei*) (votes unanimous), as a hardy flowering shrub after trial at Wisley, sent by Messrs. W. C. Slocock, Ltd., Goldsworth Nurseries, Woking.

Award of Merit

To *× Rhododendron* 'Calstocker' var. 'Exbury' (*R. calophyllum* *× R. 'Dr. Stocker'*) (votes 12 for, 1 against), as a hardy flowering shrub from E. de Rothschild, Esq., Exbury, nr. Southampton.

To *× Rhododendron* 'Yvonne' var. 'Pride' (*R. Aurora* *× R. Griffithianum*) (votes 8 for, 4 against), as a hardy flowering shrub from E. de Rothschild, Esq.

To *× Rhododendron* 'Ibex' (*R. Griersonianum* *× R. pocophorum*) (votes unanimous), as a hardy flowering shrub from E. de Rothschild, Esq.

To *× Rhododendron* 'Damaris' var. 'Logan' (*R. 'Dr. Stocker'* *× R. campylocarpum*) (votes unanimous), as a hardy flowering shrub, from J. B. Stevenson, Esq., Tower Court, Ascot, Berks.

Other Exhibits

× Rhododendron 'Varna' (*R. Caman* *× R. Williamsianum*), *× Rhododendron* 'Radiant Morn' (*R. 'Fabia'* *× R. 'Sunrise'*), *× Rhododendron* 'Ramilles' (*R. 'Ethel'* *× R. 'Redwing'*) and *× Rhododendron* 'Gretia' A.M. 1946 (*R. 'Portia'* *× R. Griersonianum*) from Lord Aberconway, Bodnant, N. Wales.

× Rhododendron 'Janet' (*R. 'Avalanche'* *× R. 'Dr. Stocker'*), *× Rhododendron* 'Nehru' (*R. Griersonianum* *× R. 'Huntsman'*), *× Rhododendron* 'Pirate' (a dark red seedling *× R. Thomsonii grandiflorum*), *× Rhododendron* 'Barbara' (*R. campylocarpum elatum* *× R. Loderi*) and *Rhododendron* 'Barbara' var. 'Pinafore' (*R. campylocarpum elatum* *× R. Loderi*) from E. de Rothschild, Esq., Exbury, nr. Southampton.

× Rhododendron 'Merops' (*R. 'Cunningham's Sulphur'* *× R. lacteum*) from Captain C. Ingram, Benenden, Kent.

Rhododendron obtusum var. *Hinodegirii* from the Director, R.H.S. Gardens, Wisley.

Rhododendron obtusum amoenum 'Tyrian Rose' from Mr. Haworth Booth, Esq., Farall Farm, nr. Haslemere, and *Rhododendron Thomsonii* hybrid (parentage unknown) from the Commissioners of Crown Lands, Windsor Great Park, Berks.

JOINT IRIS COMMITTEE—Mr. G. L. PILKINGTON, in the Chair, and eleven other members present.

Exhibits

Iris 'Tiny Treasure,' shown by N. Leslie Cave, Esq., Summerlea, Sugden Road, Thames Ditton, Surrey.

JOINT ROCK GARDEN PLANT COMMITTEE—IRIS, Lady LAWRENCE, V.M.H., in the Chair, and nine other members present.

Awards Recommended:

Award of Merit

To *Houstonia coerulea* 'Millard's Variety,' from Messrs. M. Prichard & Sons, Ltd., Riverslea Nurseries, Christchurch, Hants.

Cultural Commendation

To Mr. C. H. Hammer, The Old Rectory, Boreham, Essex, for a very fine plant of *Cytisus aspalathoides*.

MAY 4, 1948

SCIENTIFIC COMMITTEE—Mr. E. A. BOWLES, M.A., F.L.S., F.R.E.S., V.M.H., in the Chair, and five other members present.

Plants for Identification.—Specimens from Mrs. McConnel, Colmonell, Ayrshire, were identified as *Rhododendron* species of series Triflorum subseries Yunnanense, probably *R. aechmophyllum*, *Prunus Padus*, *Lonicera tatarica* probably var. *sibirica*, *Enkianthus campanulatus*, *Calycanthus floridus*, *Deutzia* species, *Halesia carolina*, *Prunus Cerasus*, double-flowered form, probably *semperflorens* the All Saints Cherry. Specimens from Prof. T. T. Barnard were identified as probably *Rosa laevigata* not yet in flower and seedling *Populus tremula*. A *Vaccinium* from Mrs. F. Stoker was referred to Kew. A shrub with light lemon-yellow flowers changing to rose, submitted by Mr. E. J. Barker and thought to have been raised from Russell Lupin seed, was identified as probably *Cytisus × versicolor Hillieri* [an identification later confirmed by Messrs. Hillier].

Proliferous Lily of Valley.—The Director of the Royal Horticultural Society's Gardens, Wisley, exhibited specimens of *Convallaria majalis prolifera*, which may have been planted at Wisley by G. F. Wilson.

Senecio Heritieri form.—Mr. G. W. Robinson exhibited a form of *Senecio Heritieri* raised from seed from Orotava which diverged from the typical form in its brighter coloured flowers.

Proliferous Larch Cones.—The Committee examined with great interest shoots of American Larch, *Larix laricina* (DuRoi) K. Koch, bearing proliferous female cones, which had been sent by Mr. H. A. Greatrex, Witton, Norwich; the axis was prolonged and carried leaves above the cluster of scales. Mr. Stearn pointed out that this vegetative extension of the female cones was described as a common abnormality of the European Larch, *Larix decidua* Miller, and that there were more than twenty references to it in teratological literature.

FRUIT AND VEGETABLE COMMITTEE—Mr. F. A. SECRETT, C.B.E., in the Chair, and fifteen other members present.

Exhibits

Group of Vegetables from The National Farmers' Union, Cromwell House, 34 Carlton Road, Southampton.

Group of Asparagus from Mr. A. W. Kidner, Bedford Farm, Lakenheath, Suffolk (West).

FLORAL COMMITTEE A—Mr. G. W. LEAK, V.M.H., in the Chair, and seventeen other members present.

Awards Recommended:

Silver-gilt Banksian Medal

To Messrs. Blackmore & Langdon, Bath, for an exhibit of Aquilegias, Delphiniums, and Polyanthus.

To Messrs. Napier, Taunton, for an exhibit of Carnations.

Silver Flora Medal

To Lindabruce Nurseries, Lancing, for an exhibit of Border Carnations.

Silver Banksian Medal

To Messrs. Allwood Bros., Haywards Heath, for an exhibit of Carnations and various Dianthus.

Flora Medal

To Hon. Clive Pearson (gr. Mr. E. Whitehead), Parham, for an exhibit of Tritonias.

To Mr. Stephen Sims, Draycott, for an exhibit of Aquilegias, Iceland Poppies, etc.

To Messrs. Edward Webb & Sons, (Stourbridge) Ltd., Stourbridge, for an exhibit of Cinerarias.

To Messrs. Wheatcroft Bros., Ltd., Nottingham, for an exhibit of Roses.

Banksian Medal

To Mr. C. Newberry, Knebworth, for an exhibit of Anemones.

To Messrs. A. R. Wills, Ltd., Romsey, for an exhibit of Chrysanthemums.

Other Exhibits

Auricula seedling No. 3 from C. J. Howlett, Esq., Earley.

Bedding plants and alpinas in window boxes from Dayspring Flowers, Ripley.

Bluebell 'Bartlett's Pink' (Preliminary Commendation, May 20, 1947) and Hippeastrums from B. Bartlett, Esq., St. Martins, Guernsey.

Irises from Award Iris Nurseries, Farley Green.

Violas from C. A. Jardine, Esq., Feltham.

FLORAL COMMITTEE B—Lord ABERCONWAY, C.B.E., V.M.H., in the Chair, nineteen other members, and Dr. J. F. Rock, Dr. J. Macqueen Cowan, and Mr. J. S. L. Gilmour (visitors) present.

Awards Recommended:

Gold Medal

To the Commissioners of Crown Lands, Windsor Great Park, for an exhibit of Japanese Azaleas.

Silver-gilt Banksian Medal

To Messrs. Hillier & Sons, Winchester, for an exhibit of Rhododendrons.

To Winkfield Manor Nurseries, Ascot, for an exhibit of a rock garden.

Silver Flora Medal

To the Knap Hill Nursery, Ltd., Woking, for an exhibit of Azaleas.

Silver Banksian Medal

To Mr. K. W. Harle, Lower Basildon, for an exhibit of succulents.

To Messrs. L. R. Russell, Ltd., Windleaham, for an exhibit of flowering shrubs.

To the Sunningdale Nurseries, Windlesham, for an exhibit of Rhododendrons.

To Messrs. J. Waterer, Sons & Crisp, Ltd., Twyford, for an exhibit of rock garden plants.

Flora Medal

To Lieut.-Col. L. H. Brammall, Salisbury, for an exhibit of rock garden plants in pans.

To Messrs. Burkwood & Skipwith, Ltd., Kingston, for an exhibit of flowering shrubs.

To Messrs. J. Cheal & Son, Crawley, for an exhibit of flowering shrubs.

To Orchard Neville Nurseries, Baltonsborough, for an exhibit of rock garden plants.

To Messrs. M. Prichard & Son, Ltd., Christchurch, for an exhibit of border and rock garden plants.

To Messrs. W. H. Rogers & Son, Eastleigh, for an exhibit of dwarf conifers and flowering shrubs.

To Shipton-on-Cherwell Nurseries, Ltd., Oxford, for an exhibit of rock garden plants in pans.

To Mr. Geo. Welch, Cambridge, for an exhibit of rock garden plants.

Banksian Medal

To Messrs. Hale & May, Cookham, for an exhibit of rock garden plants.

To the Kew Topiary Nursery, Richmond, for an exhibit of clipped Box trees.

To Messrs. Sale & Son, Wokingham, for an exhibit of shrubs and rock garden plants.

To Mr. C. H. Sands, Harpenden, for an exhibit of *Gentiana acaulis*.

To Mr. F. Street, Woking, for an exhibit of Rhododendrons.

First-Class Certificate

To *Wistaria venusta*, as a hardy flowering tree (votes 11 for, 3 against), exhibited by Col. S. R. Clarke, C.B., Borde Hill, Haywards Heath.

Award of Merit

To *Berberis* × 'Concal' (*concinna* × *calliantha*), as a hardy flowering shrub (votes 10 for, 0 against), from Capt. Collingwood Ingram, Benenden.

To *Magnolia Fraseri*, as a hardy flowering tree (votes unanimous), from Col. S. R. Clarke, C.B., Borde Hill, Haywards Heath.

To *Moraea tripetala*, as a hardy flowering plant for the cold greenhouse (votes 12 for, 3 against), from T. T. Barnard, Esq., Wareham.

To *Rosa* × 'La Follette', as a flowering shrub, hardy on a south wall (votes 13 for, 0 against), from T. T. Barnard, Esq., Wareham.

To *Tiarella Wherryi*, as a hardy flowering plant (votes 12 for, 0 against), from Mr. J. Elliott, Moreton-in-Marsh.

Other Exhibits

Billbergia nutans, exhibited by Miss Guggisberg, Caterham.

Convallaria majalis, monstrous form, exhibited by the Director, R.H.S. Gardens, Wisley.

Cypripedium Calceolus, exhibited by Mrs. Anley, Woking.

Cytisus × *versicolor* var. *Hillieri*, exhibited by E. J. Baker, Esq., Ipswich.

Halesia monticola, exhibited by Knap Hill Nursery, Ltd., Woking.

Lilium Bakerianum var. *Delavayi*, exhibited by Brig. W. J. Keswick, London, E.C. 3.

Malus hupehensis, exhibited by R. C. Notcutt, Ltd., Woodbridge.

Menziesia ciliicalyx var. *eglandulosa*, exhibited by Dr. Weir, Mersham.

Paeonia Mlokosevitschii, exhibited by Thomas Carlile, Ltd., Twyford.

Paeonia suffruticosa var. 'Haku-Unryo', exhibited by R. Tree, Esq., Dytchley Park.

Paulownia tomentosa, exhibited by Beckenham Corporation Parks Dept.

Rosa Ecae, exhibited by R. C. Jenkinson, Esq., Northampton.

Syringa microphylla hybrid, *Viola septentrionalis*, exhibited by Capt. Collingwood Ingram, Benenden.

ORCHID COMMITTEE—Mr. GURNEY WILSON, F.L.S., V.M.H., in the Chair, and four other members present.

Awards Recommended:

Award of Merit

Miltomia sanguinea ('Mrs. J. B. Crum' × 'Bruges'), (votes 5 for, 0 against), from Mr. S. Farnes, Ashcroft, East Grinstead.

NARCISSUS AND TULIP COMMITTEE—Mr. E. A. BOWLES, F.L.S., F.R.E.S., V.M.H., in the Chair, and eight other members present.

Awards Recommended:

Award of Merit

To *Narcissus* 'Red Hackle' as a variety for exhibition (voting unanimous), raised by the late Brodie of Brodie and shown by Mr. Guy L. Wilson, The Knockan, Broughshane, Co. Antrim.

To *Narcissus* 'Moville,' as a variety for exhibition (votes 6 for, 0 against), raised by the late Brodie of Brodie and shown by Mr. Guy L. Wilson.

Gold Medal

To Messrs. Barr & Sons, 13 King Street, Covent Garden, London, W.C. 2, for an exhibit of Tulips.

To Messrs. Dobbie & Co., Ltd., Edinburgh, for an exhibit of Tulips.

Silver-gilt Banksian Medal

To Messrs. J. R. Pearson & Sons, Lowdham, Notts., for an exhibit of Tulips.

Silver Flora Medal

To Messrs. Daniels Bros., Ltd., Norwich, for an exhibit of Tulips.

To Messrs. Kelway & Son, Ltd., Langport, Somerset, for an exhibit of Tulips.

To Mr. Guy L. Wilson, for an exhibit of Daffodils.

Silver Banksian Medal

To Messrs. Wakeley Bros. & Co., Ltd., Dixon's Hill Nurseries, North Mimms, for an exhibit of Tulips.

To Messrs. R. Wallace & Co., The Old Gardens, Tunbridge Wells, for an exhibit of Tulips.

Other Exhibits

Narcissus 'Cantabile,' N. 'Stout Lad' and N. 'Gala,' shown by Mr. Guy L. Wilson.

RHODODENDRON COMMITTEE—Mr. J. B. STEVENSON, V.M.H., in the Chair, and eighteen other members present.

Awards Recommended:

Award of Merit

To × *Rhododendron* Seedling B (to be named) (*R.* 'Britannia' × *R. dichroanthum*) (votes unanimous), as a hardy flowering shrub from the Earl of Limerick, Chiddingly, West Hoathley, Sussex.

To × *Rhododendron* 'Saffron Queen' (*R. aureum* × *R. burmanicum*) (votes unanimous), as a hardy flowering shrub from C. Williams, Esq., M.P., Caerhays Castle, Cornwall. To *Rhododendron* Yu 13894 (*S. Fortunei*) (votes 10 for, 1 against), as a hardy flowering shrub, from the Misses Godman, South Lodge, Horsham.

To × *Rhododendron* 'Leonardslee Giles' (*R. Standishii* and *R. Aucklandii* (*Griffithianum*)) (votes unanimous), as a hardy flowering shrub, from the Misses Godman.

To × *Rhododendron* *Loderi* var. 'Princess Marina' (*R. Loderi* 'King George' × *R. Loderi* 'Sir Edmund' (votes 7 for, 2 against), as a hardy flowering shrub from Sir Giles Loder, Bt., Leonardslee, Horsham, Sussex.

To × *Rhododendron* 'Kenlis' (*R. Middianum* × *R. orbiculare*) (votes 7 for, 3 against), as a hardy flowering shrub from the Marquis of Headfort, Headfort, Kells, Meath.

Other Exhibits

× *Rhododendron* 'May Day' A.M. 1932 (*R. haematodes* × *R. Griersonianum*), from Com. A. M. Williams, D.S.C., R.N., retd., Werrington Park, Launceston, Cornwall. × *Rhododendron* 'Charles Michael' (*R. haematodes* × *R. Thomsonii*), from Charles Williams, Esq., M.P.

× *Rhododendron* 'Goldsworth Orange' (*R. dichroanthum* × *R. discolor*), from Messrs. W. C. Slocock, Goldsworth Nurseries, Woking.

× *Rhododendron* 'Damaris' var. 'Townhill' (*R.* 'Dr. Stocker' × *R. campylocarpum*), from the Rt. Hon. Lord Swaythling, Townhill Park, Southampton.

× *Rhododendron* 'Mrs. Arthur Fawcus' (*R. caucasicum* × *R. Kewense*), from the Knaphill Nursery, Ltd., Woking.

Rhododendron sphaeranthum, *R. herpesticum* and *R. (Azalea) kiusianum alpinum*, from Mrs. A. N. Griffith, Paradise House, Newnham, Cambridge.

× *Rhododendron* hybrid seedling A. (*R.* 'Britannia' × *R. dichroanthum*), from the Earl of Limerick.

JOINT ROCK GARDEN PLANT COMMITTEE—Col. F. C. STERN, O.B.E., M.C., F.L.S., V.M.H., in the Chair, and nine other members present.

Awards Recommended:

Award of Merit.

To *Leucojum hiemale* (Niceense), as a flowering plant for the rock garden or alpine house, exhibited by Mr. F. M. Peacock, Lowlands Cottage, Tritton Avenue, Beddington, Surrey.

To *Cytisus procumbens*, as a hardy flowering shrub for the rock garden or alpine house, exhibited by Mr. R. E. Heath, 13 Maybury Close, Petts Wood, Kent.

Preliminary Commendation

To *Melandrium wisleyense* (*M. Ingramii* × *M. rotundifolium*), as a hardy flowering plant for the rock garden or alpine house, exhibited by the Director, R.H.S. Gardens, Wisley, Ripley, Surrey.

Cultural Commendation

To Miss E. M. Savory, Emberton House, Olney, Bucks, for a very fine specimen of *Rhamnus pumilus*.

Other Exhibits

Anemone alpina, from Gilbert White, Esq., Chinthurst, Warboys Road, Kingston Hill, Surrey.

Linum iberidifolium and *Saxifraga oranensis*, which the Committee desired to see in flower, from Mr. R. E. Heath, 13 Maybury Close, Petts Wood, Kent.

Saxifraga squarrosa and *Sedum dasyphyllum riffanum*, from Mrs. Robert Lukin, Lockram House, Mortimer.

Iris arenaria and *I. ruthenica*, from Miss E. M. Savory, Emberton House, Olney.

Bergeranthus (*Mesembryanthemum*) *scapiger*, from Messrs. E. C. Simmonds & Son, Verulam House Nursery, St. Albans.

Phlox andicola, from the Shipton-on-Cherwell Nurseries, Ltd., Kidlington.

Rhodohypoxis Baurii var. 'E. A. Bowles,' from Mrs. Garnett-Botfield, Beamish, Albrighton, Wolverhampton.

Celmisia verbascaefolia, from Mr. G. K. Mooney, Southmead Weald, Sevenoaks, Kent.

MAY 25, 1948

FRUIT AND VEGETABLE COMMITTEE—Mr. F. A. SECRET, C.B.E., in the Chair, and twenty-nine other members present.

Exhibits

Rhubarb 'The Sutton,' from C. J. Howlett, Esq., The Yews, 309 Wokingham Road, Earley, Reading.

Gooseberry 'Hodsdon's Early Market,' from J. Hodsdon, Esq., 22 Philip Avenue, Rush Green, Roinford, Essex.

Pear (probable seedling), from W. B. Cranfield, Esq., East Lodge, Enfield Chase, Middlesex.

FLORAL COMMITTEE A—Mr. G. W. LEAK, V.M.H., in the Chair, and twenty-two other members present.

Awards Recommended:

Award of Merit

To *Adiantum cuneatum* 'Kensington Gem,' as a cool greenhouse fern (votes 18 for, 0 against), from Messrs. Wills & Segar, Ltd., South Kensington, S.W. 7.

To *Begonia* 'Dream,' as a greenhouse flowering plant (votes 22 for, 0 against), from Messrs. Blackmore & Langdon, Bath.

Other Exhibits

Armeria mauritanica, from Messrs. W. E. Th. Ingwersen, Ltd., East Grinstead.

Pelargonium 'Radiance,' from Mr. F. Lovering, Goffs Oak.

Rose 'Fashion' (to be seen again), from Messrs. Alex. Dickson & Sons, Ltd., Newtownards.

Rose 'Spek's Yellow' (A.M. July 15, 1947), from Mr. Jan Spek, Boskoop, Holland.

Rose 'Tiny Tot,' from Messrs. Wheatcroft Bros., Ltd., Ruddington.

FLORAL COMMITTEE B—Lord ABERCONWAY, C.B.E., V.M.H., in the Chair, and thirty-three other members present.

Awards Recommended:

First-Class Certificate

To *Embothrium lanceolatum*, *Norquino Form*, as a flowering tree hardy in the South and West (votes unanimous), from Lord Aberconway, C.B.E., V.M.H., Bodnant, N. Wales.

To *Embothrium longifolium* as a flowering tree hardy in the South and West (votes 20 for, 0 against), from Mr. W. J. Marchant, Keeper's Hill Nursery, Staplehill, Wimborne.

Award of Merit

To *Allium aflatunense* as a hardy flowering herbaceous plant (votes 17 for, 5 against), from Messrs. R. Wallace & Co., Tunbridge Wells.

To *Callistemon salignus* as a half-hardy flowering shrub (votes 19 for, 0 against), from Sir Ralph Newman, Bt., Blackpool, Dartmouth.

To *Halesia diptera* as a hardy flowering tree (votes unanimous), from Colonel S. R. Clarke, C.B., Borde Hill, Haywards Heath.

To *Lilium longiflorum* 'Holland's Glory,' as a flowering plant for the greenhouse (votes 21 for, 7 against), from Messrs. van Zonnefeld Bros. & Philippo, N.V., Sassenheim, Holland.

To *Paeonia peregrina* as a hardy flowering herbaceous plant (votes 15 for, 4 against), from Colonel F. C. Stern, O.B.E., M.C., Highdown, Goring-by-Sea.

Other Exhibits

Allium albopilosum, *Penstemon hirsutus*, exhibited by the Director, Royal Botanic Gardens, Kew.

Caesalpinia japonica, *Embothrium coccineum*, *Fabiana imbricata*, *F. imbricata* var. *violacea*, *Kolkwitzia amabilis*, *Olearia insignis*, *Ornithogalum arabicum*, exhibited by Sir Ralph Newman, Bt., Dartmouth.

Cistus seedling 'Marlborough House,' exhibited by Mrs. Harrison, Hawkhurst.

Deutzia longifolia, *Syringa* sp., exhibited by W. Bentley, Esq., Burghclere.

Enkianthus campanulatus, *Neillia* Minterne Variety, *Wisteria floribunda rosea*, exhibited by Lord Digby, D.S.O., Dorchester.

Lilium 'Lysander,' exhibited by Messrs. W. A. Constable, Ltd., Tunbridge Wells.

Machilus ichangensis, exhibited by Sir Henry Price, Ardingly.

Robinia Kelseyi, *Wisteria floribunda* var. *rosea*, exhibited by Col. F. C. Stern, V.M.H., Goring-by-Sea.

Rosa rugosa hybrid, *R. Henryi*, exhibited by M. Ogilvie-Grant, Esq., Kew Green.

Styrax americana, exhibited by Mr. W. J. Marchant, Wimborne.

Tillandsia sp., exhibited by Messrs. M. Prichard & Sons, Ltd., Christchurch.

DONATIONS TO THE SOCIETY'S GARDENS AT WISLEY—contd.

LANG, Miss A. C., Olivos, Argentina; seeds. LANSDELL, F., Christchurch; plants. LARDET, C., Switzerland; seed. LAUSANNE UNIVERSITY BOTANIC GARDENS; seeds. LAWRENCE, Iris Lady, Dorking; plants, cuttings and seeds. LEAD, W. L., Stockport; plants. LEIDEN BOTANIC GARDENS, Holland; seeds. LIMERICK, The Rt. Hon. the Earl of, East Grinstead; seeds. LINDLEY, E. A., Epsom; scions. LINDSAY, Miss N., Abingdon; seeds. LINDSAY SMITH Mrs., Chilworth; seeds. LISBON BOTANIC GARDEN; seeds. LLOYD, A. E., Aberystwyth; seed. LONG ASHTON RESEARCH STATION; cuttings and plants. LOWRY, R. J., Salisbury; scions. LUND BOTANIC GARDENS; Sweden: seeds. LYSAGHT, Miss M. M., London, N.W. 11; seeds. MACNAMARA, Mrs. M., Ringwood; seeds. MALMESBURY, Countess of, Christchurch; seeds. MANGELSDORF, A. G., Honolulu; seeds. MANITOBA HARDY PLANT NURSERY; bulbs. MARSH, T. R., Kings Langley; seeds. MARTIN, Mrs. D., Tasmania; seeds. MAUGHAM, R. C., Southampton; plants. MAYDEN, Miss A., Salisbury; seeds. MCCULLOCH, Lady, Castle Douglas; plants. MEASHAM, R. H. R., N. Berwick; seeds. MARCHANT, W. J., Wimborne; plants. MIDGLEY, R. M., Penticton, Canada; scales. MIDLAND AGRIC. COLLEGE; plants. MILES, J. P., Coulsdon; plants. MILLS, G. T., Leamington Spa; seeds. MILNER, Mrs., Ipplepen; scions. MILNER, Sir William, Appletrewick; plants. MINSHULL, J., Buxton; seeds. MOORE, E. F., Derby; seeds. MONRO, Miss E., Lyme Regis; seeds. MONTEVIDEO BOTANIC GARDENS; seeds. MONTREAL BOTANIC GARDENS; seeds. MORTON ARBORETUM, Illinois; seeds. MOUNTFORT, C.C., Wimborne; seed. MULLIGAN, B. O., Seattle; seeds and bulbs. MUNICH BOTANIC GARDENS; seeds. MURRELL, Messrs.,

Shrewsbury; plants. MUSEUM OF NATURAL HISTORY, Paris; seeds. NANCY BOTANIC GARDENS, France; seeds. NANTES BOTANIC GARDENS, France; seeds. NASH, L. L., Chalfont St. Peter; seeds and tubers. NEALE, Mrs. K., Otley St. Mary; scions. NEW YORK BOTANIC GARDENS; seeds. NICOLSON, J. W., Weybridge; seeds. NORTH, J. D., Bridgnorth; plants. NOEL, Capt. D., Malaya; seeds. OGILVIE-GRANT, M., Kew Green; seeds. OGILVY, J., Forfar; seeds and cuttings. ORCHARD NEVILLE NURSERIES, Baltona-borough; plants. OREGON BULB FARMS; bulbs. OSLO UNIVERSITY BOTANIC GARDENS; seeds. OXFORD UNIVERSITY BOTANIC GARDENS; seeds. PAGE, A. G., Hartrow; seeds. PALESTINE HOUSE, London; bulbs. PALMER, J. H., Maidstone; plants. PALMER, Hon. LEWIS, Sutton Scotney; seeds. PAM, Major A., Broxbourne; seeds, bulbs and plants. PENGELLY, Lt.-Comm. J. E., Plymouth; scions. PENNELL, J., Kingston Hill; seeds. PENTON, O. S., Cobham; seeds. PEPINIERES LEPAGE & Co., France; scions. PERRINS, E. J., Honiton; plants. PERRY, A., Enfield; plants. PHILIP, W. S., Dundee; scions. PHILIPS, J. H., Madras; plants. PIKE, A. V., Buxted; plants. PIKE, E. W., Teddington; scions. PISA UNIVERSITY BOTANIC GARDENS, Italy; seeds. POMEROY, Miss G. C., Ashford; seeds. PRENTICE, W., Birmingham; canes. PURDY, C., California; plants. RAFFILL, C. P., Kew; plants. RAMAGE, G., Stafford; seeds. READ'S HYBRIDIZING NURSERIES, Hockley; Vine eyes. REID, R. D., W. Scotland Agricultural College, Ayr; scions. RENNES BOTANIC GARDENS, France; seeds and plants. RHODES, J., Guildford; bulbs. RIALI, Miss M., Bray; seeds. RICHARDSON, F. G., Bugh Heath; seeds. RICHARDSON, J. L., Waterford; bulbs. ROBB, A. J., Rowlands Castle; plants. ROBERTSON, Col. J., Godalming; seeds. ROTHSCHILD, Major E., Southampton; plants. ROUEN JARDIN DES PLANTES, France; seeds. RUSSELL, J. P., Windlesham; plants. RUSSELL, Messrs., Chichester; cuttings. SADLER, A. E., Woodford Green; scions. SANDBACH, Capt. MACKESON, Abergele; canes. SAVILL, E., Windsor Great Park; plants and cuttings. SCOTT, Dr., Ashford; seeds. SEABORNE, A., Weybridge; seeds. SELIGMAN, Dr. R., Wimbledon; plants. SERCOMBE, F. J., Sidmouth; scions. SHADDOCK, Mrs. H., Pulborough; scions. SHAND, P. MORTON, Bath; seeds. SIMMONDS, A., West Clandon; seeds. SIMMONDS, E. C., St. Albans; plants. SIMPSON, Dr. C. B., Sidmouth; plants and seeds. SIMPSON, G., Windsor; seeds and cuttings. SLOCOCK, Messrs., Woking; plants. SMITH COLLEGE, Northampton, Mass.; seeds. SOLOMONS, A., Chingford; plants. SOUSTER, J., Perth, Australia; seeds. SPFK, J. VAN, Boskoop, Holland; plants. SPENDER-CLAY, Hon. Mrs., Lingfield; plants. ST. ANDREWS BOTANIC GARDENS; seeds. ST. ANDREWS HOSPITAL, Northampton; plants. STANDFORD, Brig. H. M., Leiston; scions. STANLEY GRIFFITH, Mrs. A., Newnham; seeds. STARKE, Messrs., Fakenham; seeds. STERN, Col. F. C., Going-by-Sea; seeds. STEVENS, Capt. L. B., Helston; seeds. STEVENSON, J. B., Ascot; seeds. SITHPHENSON CLARKE, Col., Haywards Heath; plants. STOCKHOLM BOTANIC GARDENS; seeds. SOTHARD, W. A., Croydon; plant. STOUGHTON, Prof. R. H., Reading; plants. STRASBOURG UNIVERSITY BOTANIC GARDENS; seeds. STUART LOW CO., LTD., Enfield; plants. SUGDEN, Miss L. D., Manchester; seeds. SUTTONS, Messrs., Reading; seeds. SYNGE, P. M., Byfleet; seeds, cuttings and plants. TAUDEVIN, Messrs., Wirral; plants. TAYLOR, Dr. H. V., Ministry of Agric.; cuttings. TAYLOR, Dr. G., South Kensington; seeds. THOMAS, P. H., Fordingbridge; scions. THOMPSON, Miss M. C. GORDON, Ilminster; scions. THORN, Mrs. E., Frome; scions. TOMKINS, Mrs. W., Byfleet; seeds. TOWNEND, G. H., Vancouver Island; bulbs and seeds. TORRICK, H. C., Penitth; seeds. TRECONING, J. S., Launceston; scions. TRISTRAM, Major G. H., Heathfield; seeds and plants. TROTTER, R. D., Ockley; seeds. TUCK, Mrs. J. M., King's Lynn; scions. TURESSON, Prof., Upsala; seeds. TYRRELL, C. G., Folkestone; seeds. UPSALA BOTANICAL GARDENS, Sweden; seeds. URBINO UNIVERSITY BOTANIC GARDENS, Italy; seeds. UZBEX BOTANICAL GARDEN, U.S.S.R.; seeds. VANADAN, E. K., N. Malabar; seeds. VAUGHAN, H. R. H., Rhandirmwyn; scions. VERMEULEN, P., Amsterdam; plants. VILLA TARANTO GARDENS, Italy; seeds. VILMORIN-ANDRIEUX & Co., Paris; seeds. WACHER, Dr. H. S., Canterbury; seeds. WACE, Mrs. M. O., Midhurst; seeds. WAJEY, F. R., Sevenoaks; bulbs, plants and seeds. WAGENINGEN ARBOREIUM, Holland; seeds. WALKDEN, C. H., Mitcham; scions. WALLACE, Messrs., Tunbridge Wells; bulbs. WAIT, J. T., Wisley; cuttings and seeds. WALKER-FRANKLIN SPED CO., California; seeds. WALTERS, G. T., Gt. Shelford; seeds. WASFIE, J. F., Eynsham; plants and scions. WATERFIELD, Miss E. M., Bookham; seeds. WATERS, D. A., Oxford; seeds. WATKINS & SIMPSON, LTD., London, W.C. 2; seeds. WATTS, W. E., Woking; seeds and plants. WEBB, Messrs. F. & Co., Stourbridge; seeds. WEEKS, A. G., Limpsfield Common; plants. WEIBULL, W., Landskrone, Sweden; seeds. WENDEN, J. A., Caterham; seeds. WEST, Miss L., Merstham; seeds. WHITTLES, C. L., Ayr; seeds. WILLIAMS, G. N., Wheathamstead; bulbs. WILLIAMSON, Mrs. R. M., Aberdeen; seeds. WINKFIELD MANOR NURSERIES, Ascot; seeds. WOODFORD, Mrs., Cooden Beach, Sussex; plants. WOOTTON, C. R., Bloxwick; seeds. WORMALD, Miss A., Silverston; seeds. WYNDHAM HAYWARD, Florida; seeds. YONGE, Mrs. D. M., Yealampton; seeds and plants.

Extracts from THE PROCEEDINGS OF THE ROYAL HORTICULTURAL SOCIETY

GENERAL MEETINGS

May 25, 1948

ORCHID COMMITTEE—Mr. GURNEY WILSON, F.L.S., V.M.H., in the Chair, and twenty other members present.

Awards Recommended:

Award of Merit

Odontonia 'Androena' var. 'Acme' (*Odontonia* 'Andromeda' × *Miltomia* 'Lycaena') (votes 13 for, 4 against), from Messrs. Charlesworth & Co., Haywards Heath.
Odontioda 'Lola' var. 'Negus' (*Oda*. 'Argia' × *Oda*. 'Sapphira') (votes 20 for, 0 against), from Messrs. Charlesworth & Co., Haywards Heath.

Cypripedium 'Miracle' var. 'Victory' ('Nubian' × 'Mirabile') (votes 12 for, 2 against), from Messrs. Sanders, St. Albans.

Miltomia 'Maiden's Blush' (parentage unknown) (votes 14 for, 3 against), from Messrs. Sanders, St. Albans.

Preliminary Commendation

Odontoglossum 'Amabador' ('Amablicity' × 'Toreador') (votes 14 for, 4 against), from Messrs. Charlesworth & Co., Haywards Heath.

NARCISSUS AND TULIP COMMITTEE—Mr. E. A. BOWLES, F.L.S., F.R.E.S., V.M.H., in the Chair, and eleven other members present.

Awards Recommended:

Award of Merit

To *Tulipa* Sprengeri (voting unanimous), shown by Messrs. R. Wallace & Co., The Old Gardens, Tunbridge Wells.

RHODODENDRON COMMITTEE—Mr. J. B. STEVENSON, V.M.H., in the Chair and fifteen other members present.

Arising out of the Previous Minutes

Rhododendron hybrid (*R. Meddianum* × *R. orbiculare*) A.M. May 4, 1948, exhibited by the Marquis of Headfort, Headfort, Meath, has now been named *R. 'Kenlis'*.

Awards Recommended:

Award of Merit

To *Rhododendron* 'Elros' (*R. Elliottii* × *R. 'Eros'*) (votes unanimous), as a hardy flowering shrub raised and exhibited by Lord Aberconway, Bodnant, N. Wales.

To *Rhododendron* 'Jalisco' var. 'Eclipse' (*R. 'Lady Bessborough'* × *R. 'Dido'*) (votes 12 for, 2 against), as a hardy flowering shrub, raised by the late L. de Rothschild, Esq., and shown by the Commissioners of Crown Lands, Windsor Great Park.

To *Rhododendron* 'Jalisco' var. 'Elect' (*R. 'Lady Bessborough'* × *R. 'Dido'*) (votes unanimous), as a hardy flowering shrub, raised by the late L. de Rothschild, Esq., and shown by the Commissioners of Crown Lands, Windsor Great Park.

To *Rhododendron* 'Damozel' (*R. 'A.W. bright rose'* × *R. Griersonianum*) (votes 13 for, 0 against), as a hardy flowering shrub, raised by the late L. de Rothschild, Esq., and shown by E. de Rothschild, Esq., Exbury, Southampton.

To *Rhododendron* 'Halcyone' var. 'Perdita' (*R. Souliei* × *R. 'Lady Bessborough'*) (votes 9 for, 3 against), as a hardy flowering shrub, raised by L. de Rothschild, Esq., and shown by E. de Rothschild, Esq.

To *Rhododendron* 'Leo' (*R. 'Britannia'* × *R. Elliottii*) (votes unanimous), as a hardy flowering shrub, raised by the late L. de Rothschild, Esq. and shown by E. de Rothschild, Esq.

To *Rhododendron* 'Sheila Moore' (*R. decorum* × *R. Elliottii*) (votes unanimous), as a hardy flowering shrub, raised and shown by Lord Digby, D.S.O., M.C., Cerne Abbey, Dorchester.

Selected for trial at Wisley

Rhododendron 'Kluis Sensation' (*R. 'Britannia'* × an unnamed seedling), raised by Messrs. A. Kluis, Holland. Exhibited by Mr. F. Street, Heathermead Nursery, West End, Woking.

Rhododendron (Azalea) No. 188 (*R. macrantha* × *R. Caldwellii*) and *Rhododendron (Azalea)* No. 214 (parentage not given). Exhibited by Messrs. D. Stewart & Son, Ferndown Nurseries, Dorset.

Other Exhibits

Rhododendron 'Vanessa' var. 'Pastel' A.M. 1946 (*R. 'Soulbut'* × *R. Griersonianum*) and *R. 'Ruddigore'* (*R. Griersonianum* × *R. Delavayi*) from Lord Aberconway.

Rhododendron 'Panoply' var. 'Red Chief' (*R. 'G. A. Sims'* × *R. eriogynum*), from Sir Giles Loder, Bt., Leonardslee, Horsham, Sussex.

Rhododendron No. 415 (*R. 'Fireglow'* × *R. Elliottii*), *R. No. 428* (*R. 'Fabia'* × *R. Elliottii*) and *R. No. 507* (*R. 'Master Dick'* × *R. Griersonianum*) which the Committee desired to see as a single truss, from C. E. Colbourn, Esq., Romsey Cottage, Embley Park, Romsey, Hants.

Rhododendron 'Jalisco' var. 'Janet' (*R. 'Lady Bessborough'* × *R. 'Dido'*) and *R. 'Jalisco'* var. 'Emblem' from the Commissioners of Crown Lands, Windsor Great Park.

Rhododendron Souliei, from Major A. E. Hardy, Sandling Park, Hythe, Kent.

Rhododendron 'Istanbul' (*R. 'Mrs. H. Stocker'* × *R. Elliottii*), *R. 'Phoenix'* (*R. 'Dawn's Delight'* × *R. 'Tally-Ho'*) and *R. 'Iviza'* (*R. 'Fabra'* × *R. 'Bustard'*) from E. de Rothschild, Esq., Exbury.

Rhododendron 'Gwillt King' (*R. zeylanicum* × *R. Griersonianum*), *R. 'Jacquetta'* (*R. facetum* × *R. Griersonianum*) and an unnamed hybrid (*R. Wardii* × *R. crassum*), from Lord Digby, Cerne Abbey, Dorchester.

JOINT PERPETUAL FLOWERING CARNATION COMMITTEE—Mr. GEO. MONRO, V.M.H., in the Chair, and eleven other members present.

Exhibits

'Amateur's Scarlet,' 'Amateur's Deep Salmon' and 'Amateur's Flesh Pink,' all to be seen again, shown by Messrs. Allwood Bros. Ltd., Wivelsfield Nurseries, Haywards Heath, Sussex.

JOINT DIANTHUS COMMITTEE—Mr. GEO. MUNRO, V.M.H., in the Chair, and sixteen other members present.

Award of Merit

Imperial Pink 'Crimson Glory' as a show variety, votes 16 for, 0 against, shown by Lindabruce Nurseries, Freshbrook Road, Lancing, Sussex.

Selected for trial at Wisley

Imperial Pinks 'Salmon Queen,' 'Crimson Glory' and 'Pink Lady,' all shown by Lindabruce Nurseries, Lancing, Sussex.

Dianthus haematocalyx var. *alpina*, shown by Messrs. A. R. & K. M. Goodwin, Stocklands Estate, Bewdley, Worcs.

Cultural Commendation

Dianthus haematocalyx var. *alpina*, shown by Messrs. A. R. & K. M. Goodwin, Stocklands Estate, Bewdley, Worcs.

Other Exhibits

'Mrs. F. Clark' from Messrs. M. Prichard & Sons, Ltd., Christchurch, Hants.

Imperial Pink 'Lassie' from Lindabruce Nurseries, Lancing, Sussex.

JOINT IRIS COMMITTEE—Colonel F. C. STERN, F.L.S., V.M.H., in the Chair, and seventeen other members present.

Selected for trial at Wisley

Bearded Iris 'Chivalry,' from C. W. Christie-Miller, Esq., Swyncombe House, Swyncombe, Henley.

Bearded Irises, Seedling 31/42/3, 'Katherine Fay,' 'Mattie Gates,' 'Staten Island,' Seedlings 816, 819 and 821, 'Hy Time,' 'Admiral Nimitz,' 'Nightingale,' 'Pale Primrose,' 'Fort Ticonderoga,' 'Flamely,' 'Edward Lapham,' 'Black Forest,' 'Gipsy Rose,' 'Deep Velvet' and 'Berkley Gold' all shown by H. J. Randall, Esq., Sandilands, Brooklyn Road, Woking, Surrey.

Bearded Iris 'Molly' from N. Leslie Cave, Esq., Summerlea, Sugden Road, Thames Ditton, Surrey.

Bearded Irises 'Admiration,' 'Spindrift,' 'Ola Kala,' 'Desert Song,' 'Jasmine,' 'Marion Vaughan,' 'Lothario' and 'Blue Valley' all from Award Iris Nurseries, Guildford, Surrey.

Dutch Irises 'Harmon Kapel,' Seedling White No. 222, 'Krommenie,' 'Harry Mortimer,' 'Fairey Aviation,' 'Luet,' 'Euterpe,' 'Schiedam,' 'Poissy,' 'Herenthals,' Seedling Yellow No. 221 and 'Narvik,' all from Messrs. Roose's, Hillegom, Holland.

Other Exhibits

Iris laevigata × *I. setosa* from Major G. H. Tristram, Cox's Hill, Dallington, Sussex.
 Bearded Irises 'Blue Valley,' Seedling 43/PX2, 'Franconia,' Seedling 820, 'Wonderful,' 'Blue Refrain,' 'Capitol,' 'Amandine,' 'City of Stratford,' 'Tapestry Rose,' Seedling 825, 'Lord Dougan,' 'Robin McGregor,' 'Minnie Colquitt,' 'Arab Chief' and *Iris sibirica* 'Eric the Red,' all from H. J. Randall, Esq., Woking, Surrey.

Bearded Irises 'Homespun' and 'Peter Claude' from N. Leslie Cave, Esq., Thames Ditton, Surrey.

Bearded Irises 'Naranja,' 'Sweet Alibei' and 'Fingest' from Messrs. J. Waterer Sons & Crisp Ltd., The Floral Mile, Twyford, Berks.

Bearded Irises 'Midgol,' 'Toot Baldon' and 'Antigua' from Mrs. B. Z. Seligman, 22 Ilchester Place, London, W. 14.

Bearded Irises 'Red Valour' and 'Loomis V20,' and Dutch Irises 'Saxe Blue,' 'Bronze Beauty,' 'Harmony,' 'White Perfection,' 'King Mauve,' 'White Pearl,' 'Princess Irene,' 'Blue Champion,' 'Jeanne d'Arc,' 'Early Bronze,' 'Alaska,' 'Mauve Queen' and 'Blue Pearl' all Award Iris Nurseries, Guildford, Surrey.

The Awards to the Wisley trials were confirmed.

JOINT ROCK GARDEN PLANT COMMITTEE—Col. F. C. STERN, F.L.S., V.M.H., in the Chair, and seventeen other members present.

Awards Recommended:*Award of Merit*

Euphorbia amygdaloides variegata as a hardy, ornamental-foliaged plant for the rock garden or woodland (votes 15 for, 0 against), from Messrs. A. R. & K. M. Goodwin, Bewdley.

Mertensia rivularis japonica as a flowering plant for the rock garden and alpine house (votes unanimous), from Mr. G. H. Berry, The Highlands, Enfield.

Cultural Commendation

To Mrs. C. B. Saunders, Green Street Green, Kent, for a pan of *Campamula anchusiflora*.

Plants to be seen again

Miniature Roses 'Pixie,' 'Midget,' and 'Sweet Fairy' exhibited by Miss Anne Ashberry Chelmsford.

JUNE 8, 1948

SCIENTIFIC COMMITTEE—Mr. E. A. BOWLES, M.A., F.L.S., F.R.E.S. V.M.H., in the Chair, and three other members present.

Hybrid Pelargoniums.—Mr. A. Langley Smith showed a series of leaves of scented Pelargoniums derived from *Pelargonium quercifolium* × *P. denticulatum* × (*P. denticulatum* × *P. filicifolium* F3). The leaves were from F2 plants raised from seed collected in 1938 and in 1946. Eight plants of the former were raised out of 200 seeds sown in 1947, and 48 out of 100 seeds of the latter sown at the same time. The leaves were, for the most part, of large size and showed in a marked way the influence of *P. filicifolium* in the deeply pinnatisect segments, usually cut down to the midrib. Mr. Smith found that dominant characters were tall against dwarf, slight scent against strong scent, green leaves against variegated leaves whether the variegation were brown, yellow, or white, coloured against white flowers, entire petals against split or notched petals.

Plants for Naming.—*Eucalyptus pauciflora* in full flower and a well-flowered pink seedling of the *Leptospermum-scoparium-Nichollsii* group were received from Mrs. Blaythwayt of West Porlock, and a Chinese *Deutzia* later identified at Kew as *Deutzia longifolia* from Mr. Bentley of Newbury.

FRUIT AND VEGETABLE COMMITTEE—Mr. F. A. SECRETT, C.B.E., in the Chair, and fifteen other members present.

Exhibits

Apple Seedling ('Barnack Beauty' × 'Wellington') from J. F. Wastie, Esq., Eynaham, Oxford.

FLORAL COMMITTEE A—Mr. G. W. LEAK, V.M.H., in the Chair, and fourteen other members present.

Awards Recommended:*Gold Medal*

To Messrs. Bakers Nurseries, Ltd., Wolverhampton, for an exhibit of Russell Lupins.

Silver-gilt Flora Medal

To the Algemeene Vereeniging voor Bloembollencultuur afd. Uitgeest, Bonkenburg, Uitgeest, Holland, for an exhibit of bulbous plants.

Silver-gilt Banksian Medal

To Messrs. Allwood Bros., Ltd., Haywards Heath, for an exhibit of *Dianthus Allwoodii*, Pinks and various *Dianthus*.

Silver Flora Medal

To Messrs Thomas Carlile Ltd., Twyford, for an exhibit of herbaceous plants.

To Lindabruce Nurseries, Lancing, for an exhibit of Pinks.

To Messrs. R. Wallace & Co., Tunbridge Wells, for an exhibit of Irises and bulbous plants.

To Messrs. John Waterer Sons & Crisp, Ltd., Twyford, for an exhibit of herbaceous plants.

Silver Lindley Medal

To Rev. Canon Rollo Meyer, Little Gaddesden, for an exhibit of Irises.

Silver Banksian Medal

To Award Iris Nurseries, Guildford, for an exhibit of Irises.

Flora Medal

To Messrs Hale & May, Ltd., Cookham, for an exhibit of herbaceous plants and alpine.

To Messrs. Kelway & Son, Ltd., Langport, for an exhibit of Paeonies and Delphiniums.

To Messrs. Wm. Lowe & Son, Beeston, for an exhibit of Roses.

To Messrs. M. Prichard & Sons, Ltd., Christchurch, for an exhibit of herbaceous plants and alpine.

To Messrs. Stark & Son, Ltd., Fakenham, for an exhibit of Iceland Poppies.

To Mr. G. C. Whitelegg, Chislehurst, for an exhibit of Irises.

Banksian Medal

To Mr. C. Newberry, Knebworth, for an exhibit of Pinks, Anemones, Poppies.

To the Orpington Nurseries Co., Ltd., Orpington, for an exhibit of Irises.

To Messrs. W. Pike & Son, Newark, for an exhibit of Pyrethrums and *Aster yunnanensis* 'Napsbury.'

Other Exhibits

Pelargonium 'Brackenheath Beauty' from Mr. H. R. Falkner, Leigh, Sherborne.

Violas and Roses from Mr. C. A. Jardine, Feltham.

FLORAL COMMITTEE B—Col. F. C. STERN, F.L.S., V.M.H., in the Chair, and eighteen other members present.

Awards Recommended:

Silver Flora Medal

To Winkfield Manor Nurseries, Ascot, for an exhibit of a rock garden.

Silver Banksian Medal

To Mr. F. Street, West End, Woking, for an exhibit of Rhododendrons.

Flora Medal

To Mr. K. W. Harle, Lower Basildon, for an exhibit of succulents.

Banksian Medal

To the Kew Topiary Nurseries, Richmond, for an exhibit of clipped Box trees.

To Messrs. Sale & Son, Wokingham for an exhibit of rock garden plants.

Award of Merit

To *Baptisia australis* as a hardy, flowering herbaceous plant (votes 15 for, 0 against), from Mr. J. Coutts, V.H.M., Lasswade, Greenmeads, Westfield, Woking.

To Rose 'Lawrence Johnston' (syn. 'Hidcote Yellow') as a hardy flowering climber (votes unanimous), from Messrs. T. Hilling & Co., The Nurseries, Chobham, Woking.

Other Exhibits

Achillea micrantha, exhibited by Messrs. Thomas Carlile, Ltd., Tywford.

Aquilegia × Birch Hybrid, exhibited by Messrs. W. E. Th. Ingwerson, Ltd., East Grinstead.

Cistus 'Elma,' exhibited by Capt. Collingwood Ingram, Benenden.

Cornus Kousa var. *chinensis*, exhibited by C. Armytage Moore, Esq., Cranleigh.

Neillia longiracemosa, exhibited by W. Bentley, Esq., Newberry.

Paeonia Delavayi × *tutea*, *P. Veitchii* seedling, *P. Veitchii* var. *Woodwardii*, exhibited by Mrs. C. E. Morton, Droitwich.

Philadelphus Delavayi forma *Yu 14685*, exhibited by Hon. L. Palmer, Sutton Scotney.

Rosa gallica complicata, exhibited by Messrs. T. Hilling & Co., Chobham.

ORCHID COMMITTEE—Mr. GURNEY WILSON, F.L.S., V.M.H., in the Chair, and eight other members present.

Awards Recommended :

Silver Flora Medal

To Messrs. Charlesworth & Co., Haywards Heath, for a group comprising 46 examples of various *Odontonias*.

Award of Merit

Odontonia 'Olga' var. 'Duchess of Edinburgh' (*Odontonia* 'Thisbe' × *Odontoglossum crispum*) (votes 5 for, 2 against), from Messrs. Charlesworth & Co., Haywards Heath.

RHODODENDRON COMMITTEE—Mr. J. B. STEVENSON, V.M.H., in the Chair, and nine other members present.

Arising out of the previous minutes

The unnamed *Rhododendron* hybrid which received the A.M. when exhibited by the Misses Godman on May 4 has now been identified as × *Rhododendron* 'Leonardslee Giles' (*R. Standishii* × *R. Griffithianum*).

Rhododendron Seedling B (*R. 'Britannia'* × *R. dichroanthum*), exhibited by the Earl of Limerick, K.C.B., D.S.O., on May 4, 1948, has been named *R. 'Limerick'* var. 'Margela.'

Awards Recommended:

Cultural Commendation

To Mr. R. J. Wallis, head gardener to Sir Henry Price, Wakehurst Place, Ardingly, Sussex, for *Rhododendron stamineum*.

Other Exhibits

Rhododendron facetum (A.M. 1938) and *R. diaprepes* (A.M. 1926) from C. Armytage Moore, Esq., Winterfold House, Cranleigh, Surrey.

Rhododendron 'Fairy Light' (*R. 'Lady Mar'* × *G. Griersonianum*), *R. 'Indiana'* (*R. scyphocalyx* × *R. Kyawii*), *R. 'Iliad'* (*R. 'Nereid'* × *R. Kyawii*), *R. 'Inamorata'* (*R. Wardii* × *R. discolor*), *R. Isabella* var. 'Exbury' (*R. Griffithianum* × *R. auriculatum*), *R. Souldis* var. 'Exbury' (*R. Souliei* × *R. discolor*), *R. 'Felis'* (*R. dichroanthum* × *R. facetum*) and *R. Keysii*, from E. de Rothschild, Esq., Exbury, nr. Southampton.

Rhododendron 'Firetail' var. 'Trident' (*R. 'Britannia'* × *R. eriogynum*), from Sir Giles Loder, Bt., Leonardslee, Horsham, Sussex, and *R. 'Perseverance'* (*R. 'Lady Chamberlain'* × *R. cinnabarium* var. *Roylei*), from M. Adams-Acton, Esq., 37, Palace Gate, W.8.

JOINT DELPHINIUM COMMITTEE—Mr. T. HAY, V.M.H., in the Chair, and seven other members present.

Awards Recommended:

Award of Merit

'Janet Wort' as an exhibition variety (votes 7 for, 0 against), shown by Mrs. B. D. Wort, 18 Upper Woodcote Village, Purley, Surrey.

JOINT DIANTHUS COMMITTEE—Mr. T. HAY, V.M.H., in the Chair, and fourteen other members present.

Awards Recommended:

Award of Merit

Allwoodii 'Derek,' as an exhibition variety (votes 6 for, 0 against), and 'Show Ideal,' as an exhibition variety (votes 8 for, 0 against), both shown by Messrs. Allwood Bros., Ltd., Wivelsfield Nurseries, Haywards Heath, Sussex.

Selected for trial at Wisley

'Lilac Musgrave,' 'Show Gem,' Allwoodii 'Anne,' Allwoodii 'Derek,' Allwoodii 'Rupert,' 'Show Glory,' Allwoodii 'Brian,' and 'Show Ideal,' all shown by Messrs. Allwood Bros., Ltd., Haywards Heath, Sussex.

'London Poppet,' shown by F. R. McQuown, Esq., 39 Farm Avenue, London, N.W.2. 'Imperial Pink Lassie,' and 'Imperial Pink Gaiety,' from Lindabruce Nurseries, Freshbrook Rd., Lancing, Sussex.

Other Exhibits

'Laced Charm,' Allwoodii 'Ronald,' Allwoodii 'Brenda,' 'Show Enchantress,' 'Show Laddie,' 'Laced Conqueror,' 'Show Supreme,' and 'Laced Delight,' all from Messrs. Allwood Bros., Ltd., Haywards Heath, Sussex.

'Gerrard Steward,' from Mr. E. J. Barker, Kelmscott, London Rd., Ipswich.

'Brian Armstrong,' from B. Armstrong, Esq., Nether Boweries, Ditchling, Sussex.

JOINT IRIS COMMITTEE—Col. F. C. STERN, F.L.S., V.M.H., in the Chair, and fourteen other members present.

Awards Recommended:

Award of Merit

Iris filifolia, as a bulbous plant for cold frame cultivation (votes 12 for, 0 against), from Captain Collingwood Ingram, The Grange, Benenden, Cranbrook, Kent.

Selected for trial at Wisley

Beaded Irises 'Action Front,' 'Extravaganza,' 'Spun Gold,' 'Red Valour,' 'Blue Glow,' 'Mulberry Rose,' 'Sharkskin,' 'Black Banner,' and *sibirica* 'Tycoon,' all from Award Iris Nurseries, Guildford, Surrey.

Bearded Iris Seedling 317A, from N. L. Cave, Esq., Summerlea, Sugden Road, Thames Ditton, Surrey.

Bearded Irises, Seedlings B.715, B.716 and B.717, all from Sir Cedric Morris, Benton End, Hadleigh, Suffolk.

Bearded Iris 'Blue Shadows,' from G. L. Pilkington, Esq., Lower Lee, Woolton, nr. Liverpool.

Bearded Irises, Seedling 830, 'Amandine,' 'Vatican Purple,' 'Black Banner,' and Captain Wells, all from H. J. Randall, Esq., Sandilands, Brooklyn Road, Woking, Surrey.

Dutch Irises 'Zaandyk,' 'Pal' and 'Lieve,' all from Messrs. Rooses, Hillegom, Holland.

Other Exhibits

Bearded Irises 'Loomis V. 20,' 'Copper Glow,' 'Pink Reflection,' 'W. J. Thomas,' and 'Tishomingo,' all from Award Iris Nurseries, Guildford, Surrey.

Dutch Irises 'Royal Fuseliers,' 'Shiedam,' 'Herdersum,' 'Eysden,' 'Lent,' 'Fairey Aviation,' 'Herenthals,' 'Philips,' 'Boussu' and 'Harry Mortimer,' all from Messrs. Rooses, Hillegom, Holland.

JOINT ROCK GARDEN PLANT COMMITTEE—IRIS, Lady LAWRENCE, V.M.H., in the Chair, and five other members present.

Exhibits

Fumaria africana, from Messrs. W. E. Th. Ingwersen, Ltd., Birch Farm Hardy Plant Nursery, East Grinstead, Sussex.

JUNE 22, 1948

SCIENTIFIC COMMITTEE—Mr. E. A. BOWLES, M.A., F.L.S., F.R.E.S., V.M.H., in the Chair, and five other members present.

Plants for naming.—A tall white-flowered broad-leaved *Armeria*, grown by Mr. Collingwood Ingram and collected by him at Capo da Roca, 30 miles north of the mouth of the Tagus, was provisionally identified as *A. plantaginea* var. *leucantha*. An *Orobanche*, which had appeared on the roots of *Echium Wildpretii*, grown by Lord Aberconway, and a *Duranta* species (E. K. Balls 5486), grown by Col. F. R. Clarke, were referred to Kew. Mr. J. S. L. Gilmour undertook to check the identification of a *Philadelphus* exhibited by Col. F. C. Stern as *P. pekinensis* var. *brachybotrys*.

Abnormal Aquilegia.—An extremely abnormal specimen of an *Aquilegia*, which had appeared in a bed of the many-coloured long-spurred hybrids, was submitted by Mr. H. A. Lucas of Buckhurst Hill, Essex. The flowers were virescent, the spurs reduced or absent; the carpels showed every intermediate from a stalked flattened open leaf-like structure with appendages along its edges to a completely closed ovule-bearing structure. They were referred to Dr. Agnes Arber for further examination.

FRUIT AND VEGETABLE COMMITTEE—Mr. A. CHEAL, in the Chair, and ten other members present.

Awards Recommended:

Award of Merit

To Strawberry 'Auchencruive Climax,' a variety bred for resistance to red core (voting unanimous), from the National Fruit Trials, Wisley, Ripley, Surrey, raised by R. D. Reid, Esq., West of Scotland Agricultural College, Auchencruive, Ayr.

FLORAL COMMITTEE A—Mr. G. W. LEAK, V.H.M., in the Chair, and fifteen other members present.

Awards Recommended:

Silver-gilt Flora Medal

To Messrs. R. H. Bath Ltd., Wisbech, for an exhibit of *Paeonies* and *Irises*.

To Lindabrace Nurseries, Lancing, for an exhibit of Border *Carnations* and *Pinks*.

Silver-gilt Banksian Medal

To Messrs. Bees Ltd., Chester, for an exhibit of herbaceous plants.

To Messrs. T. Carlile Ltd., Twyford, for an exhibit of herbaceous plants.

To St. Andrew's Hospital, Northampton (head gardener Mr. S. M. Gault), for an exhibit of *Rochea coccinea*.

Silver Flora Medal

To Messrs. Allwood Bros., Ltd., Haywards Heath, for an exhibit of Carnations and Pinks.

To Messrs. Wm. Lowe & Son, Beeston, for an exhibit of Roses.

To Messrs. L. R. Russell Ltd., Windlesham, for an exhibit of Fuchsias.

To Messrs. John Waterer Sons & Crisp Ltd., Twyford, for an exhibit of Paeonies.

To Messrs. Ed. Webb & Sons (Stourbridge) Ltd., Stourbridge, for an exhibit of Sweet Peas.

Silver Banksian Medal

To Messrs. Kelway & Son Ltd., Langport, for an exhibit of Delphiniums and Paeonies.

To Messrs. Stark & Son Ltd., Fakenham, for an exhibit of Iceland Poppies.

To Suffolk Seed Stores Ltd., Woodbridge, for an exhibit of herbaceous plants.

Flora Medal

To Messrs. Biddlecombe Bros., Bracknell, for an exhibit of Carnations.

To Burleydam Nurseries (Chester) Ltd., Wirral, for an exhibit of Campanulas, Pinks and Gaillardias.

To Messrs. Hale & May Ltd., Cookham, for an exhibit of Roses.

To Messrs. M. Pritchard & Sons, Christchurch, for an exhibit of herbaceous plants.

To Messrs. E. W. Stedman, Ltd., Peterborough, for an exhibit of Roses.

To Messrs. Wheatcroft Bros. Ltd., Nottingham, for an exhibit of Roses.

To Winkfield Manor Nurseries, Ascot, for an exhibit of Roses.

To Messrs. H. Woolman Ltd., Birmingham, for an exhibit of Chrysanthemum 'Woolman's Perpetual White.'

Banksian Medal

To Award Iris Nurseries, Guildford, for an exhibit of Irises.

To Messrs. B. R. Cant & Sons, Colchester, for an exhibit of Roses.

To G. T. Crouch, Esq. (gr. Mr. G. W. Clark), Esher, for an exhibit of Gloxinias and Coleus.

To Mr. C. Newberry, Knebworth, for an exhibit of Dianthus and Iceland Poppies.

To H. Ralph, Esq., Dover, for an exhibit of Blue Hydrangeas.

Award of Merit

To Gaillardia 'Wirral Flame,' as a hardy herbaceous plant for cutting, market and the herbaceous border (votes 15 for, 0 against), from Burleydam Nurseries (Chester) Ltd., Wirral, Cheshire.

To *Rochea coccinea* as a cool greenhouse flowering plant (votes 15 for, 0 against), from the Governors of St. Andrew's Hospital (gr. Mr. S. M. Gault), Northampton.

Other Exhibits

Campanula persicifolia 'Wirral Belle,' from Burleydam Nurseries (Chester) Ltd., Wirral.

Chrysanthemum maximum 'Earliest of All,' from Messrs J. Golby & Son, Northampton.

Roses and Violas, from Mr. C. A. Jardine, Feltham.

FLORAL COMMITTEE B—Lord ABERCONWAY, C.B.E., V.H.M., in the Chair, and twenty other members present.

Awards Recommended:*Silver-gilt Banksian Medal*

To Messrs. W. A. Constable Ltd., Southborough, for an exhibit of Lilies, Irises, and Alstroemerias.

Silver Flora Medal

To Winkfield Manor Nurseries, Ascot, for an exhibit of a rock garden.

Silver Banksian Medal

To Messrs. Burkwood & Skipwith Ltd., Kingston, for an exhibit of flowering shrubs.

Flora Medal

To Mr. K. W. Harle, Lower Basildon, for an exhibit of succulents.

To Mr. W. Kibble, Lightwater, for an exhibit of rock garden plants.

To Mr. F. Street, Woking, for an exhibit of Rhododendrons and Kalmias.

Banksian Medal

To Messrs. Hale & May, Cookham, for an exhibit of rock garden and border plants.
To Kew Topiary Nurseries, Richmond, for an exhibit of clipped Box trees.
To Mr. J. Robinson, Eltham, for an exhibit of rock garden plants.

Award of Merit

To *Alstroemeria* 'Walter Fleming,' as a hardy, flowering herbaceous plant (votes 16 for, 2 against), from Colonel S. R. Clarke, C.B., Borde Hill, Haywards Heath.
To *Chlidanthus fragrans* as a tender flowering plant (votes 10 for, 2 against), from Messrs. R. Wallace & Co., Tunbridge Wells.
To *Eremurus* 'Sunset,' as a hardy herbaceous flowering plant (votes unanimous), from Col. F. C. Stern, O.B.E., M.C., Goring-by-Sea.
To *Rosa alba* 'Celestial,' as a hardy flowering shrub (votes unanimous), from Messrs. T. Hilling & Co., The Nurseries, Chobham, Woking.

Other Exhibits

Alstroemeria pelegina, *Duranta* sp. Balls 5486, exhibited by Col. S. R. Clarke, C.B., Haywards Heath.
Armeria sp., *Crimum natalense*, *Spiraea japonica*, exhibited by Capt. Collingwood Ingram, Benenden.
Cornus Kousa var. *chinensis*, exhibited by Messrs. R. C. Notcutt, Ltd., Woodbridge.
Eucomis amaryllidifolia, exhibited by Hon. Clive Pearson, Pulborough.
Lilium Wardii, *Orobanche* sp., exhibited by Lord Aberconway, C.B.E., V.H.M., Bodnant.
Orchis maculata, exhibited by C. G. Grosvenor, Esq., St. Albans.
Primula Abertay Hybrids, exhibited by Mrs. K. R. Pattullo, Kirriemuir.
Rosa damascena 'Mme. Hardy,' *R. Paulii* var. *rosea*, exhibited by Messrs. T. Hilling & Co., Chobham, Woking.
Roscoea cauleoides, purple form, exhibited by Anne, Lady Brocket, Ware.
Scilla peruviana, exhibited by Sir Henry Price, Ardingly.
Yucca gloriosa var., exhibited by P. M. Syngé, Esq., West Byfleet.

ORCHID COMMITTEE—Mr. GURNEY WILSON, F.L.S., V.H.M., in the Chair, and nine other members present.

Awards Recommended:**Silver Flora Medal**

To Messrs. Charlesworth & Co., Haywards Heath, for a group comprising about sixty examples of *Odontoglossum crispum*, all home-raised from seed and of very fine quality.

Silver Banksian Medal

To Messrs. Sanders, St. Albans, for a group of Orchids.

Cultural Commendation

To Messrs. Sanders, St. Albans, for a vigorous plant of *Ansellia confusa* var. *lutea*.

RHODODENDRON COMMITTEE—Mr. J. B. STEVENSON, V.M.H., in the Chair, and nine other members present.

Selected for trial at Wisley

Rhododendron indicum (*Azalea macrantha*) exhibited by Sir Henry Price, Wakehurst Place, Ardingly, Sussex.

Other Exhibits:

Rhododendron 'Capriole' (*R.* 'Etna' × 'Jacquetta'), from Lord Aberconway, Bodnant, N. Wales, and *R.* 'Red Cap' var. 'Borde Hill' (*R. didymum* × *R. eriogynum*), from Col. S. R. Clarke, Borde Hill, Haywards Heath, Sussex.

JOINT BORDER CARNATION AND PICOTEE COMMITTEE—Mr. T. HAY, V.M.H., in the Chair, and eight other members present.

Awards Recommended:**Award of Merit**

To 'Apricot Bizarre' and 'Crimson Model,' as exhibition varieties (votes 8 for, 0 against) in each case, shown by Messrs. Allwood Bros. Ltd., Wivelsfield Nurseries, Haywards Heath, Sussex.

To 'Peter Robin,' as an exhibition variety (votes 8 for, 0 against), shown by Lindabruce Nurseries, Freshbrook Road, Lancing, Sussex.

To 'Friendship,' as an exhibition variety (votes 7 for, 0 against), shown by Mr. F. W. Goodfellow, Valley Nurseries, Albridge, Staffs.

Selected for trial at Wisley

'Cottage Vivid,' 'Cottage Apricot,' 'Apricot Bizarre,' 'Crimson Model' and 'Picotee Pierrette,' all shown by Messrs. Allwood Bros., Ltd., Haywards Heath, Sussex.

'Peter Robin' and 'Starlight,' shown by Lindabruce Nurseries, Lancing, Sussex.

'Friendship,' shown by Mr. F. W. Goodfellow, Albridge, Staffs.

Other Exhibits

Cherry Flake,' shown by Messrs. Allwood Bros. Ltd., Haywards Heath, Sussex.

Extracts from THE PROCEEDINGS OF THE ROYAL HORTICULTURAL SOCIETY

GENERAL MEETINGS

June 22, 1948

JOINT DELPHINIUM COMMITTEE—Mr. T. HAY, V.M.H., in the Chair, and ten other members present.

Selected for trial at Wisley

'Dora Cairncross,' shown by G. T. Cairncross, Esq., 54 Fitzjames Avenue, Croydon, Surrey.

'Ruth Langdon,' shown by Messrs. Blackmore & Langdon, Twerton Hill Nursery, Bath.

JOINT DIANTHUS COMMITTEE—Mr. T. HAY, V.M.H., in the Chair, and eight other members present.

Selected for trial at Wisley

'London Gem' and 'London Girl,' shown by F. R. McQuown, Esq., 39 Farm Avenue, London, N.W.2.

JOINT IRIS COMMITTEE—Colonel F. C. STERN, F.L.S., V.M.H., in the Chair, and eight other members present.

Selected for trial at Wisley

Iris ochroleuca Seedling and *Iris Louisiana* 'Martha Washington,' shown by H. J. Randall, Esq., Sandilands, Brooklyn Road, Woking, Surrey.

Other Exhibits

Iris spuria 'Sunny Day,' 'Fairy Wand' and 'Washington Yellow' all shown by H. J. Randall, Esq., Woking, Surrey.

July 6, 1948

SCIENTIFIC COMMITTEE—Mr. E. A. BOWLES, M.A., F.L.S., F.R.E.S., V.M.H., in the Chair, and three other members present.

Aberrant Aquilegia—Dr. Agnes Arber wrote that the *Aquilegia* from Mr. H. A. Lucas of Buckhurst Hill, shown at the last Meeting, was a remarkably fine example of the abnormality showing virescence and leafiness of the sepals, honey-leaves, carpels and ovules. The interest centres in the carpels, which in some flowers are represented by simple stalked leaves without ovules, and, in others, by more or less completely open structures, bearing marginal ovules, which are sometimes more or less normal, but sometimes are replaced by little leaves or leaflets growing from the edges of the carpels. This abnormality was described by L. J. Celakovsky, in a paper called "*Vergrünungsgeschichte der Eichen von Aquilegia*," *Bot. Centralblatt*, vol. x, pp. 331-42, 372-82 (1882). This author considers that this abnormality proves that the ovule is of foliar nature, and not, as some botanists think, a shoot.

Gall on Elm—Mr. A. P. Balfour of Slough sent examples of bladder galls on elm leaves from a hedge. The galls were caused by the attack of the Aphis, *Pemphigus pallidus*, many specimens of which were present in them.

Datura fastuosa—Mr. Winter showed a plant of the annual *D. fastuosa* with a double corolla, violet outside, white within, much like the coloured plate in *The Garden*, vol. 46, where it was figured as *D. cornucopia*, a garden name for this species.

Allium cernuum—Messrs. Hilling of the Nurseries, Chobham, showed a remarkably vigorous plant of *Allium cernuum* with purple flowers. The usual colours seen are white or rose or an intermediate between. The present is a striking and beautiful plant.

Various plants for naming—Plants received for naming at recent meetings had been identified through Dr. Turrill at Kew as follows:—Chinese *Deutzia* from Mr. Bentley as *D. longifolia*; Broomrape on *Echium Wildpretii* from Lord Aberoonway as *Orobancha apiculata* (= *O. minor*), common on clovers; Eucalyptus in full flower from Mrs. Blathwayt of West Porlock as *E. Sieberiana*; shrub from Colonel Stephenson Clarke, received as seed E. K. Balls 5486, as *Duranta erecta*; a robust *Armeria latifolia* form with white flowers; and *Philadelphus* 'Voie Lactée.'

FRUIT AND VEGETABLE COMMITTEE—Mr. A. CHEAL in the Chair, and nine other members present.

Selected for trial at Wisley

Red Currant 'Ball's Seedling' from Messrs. J. C. Algrove, Ltd., The Nurseries, Middle Green, Langley, Bucks.

Raspberry 'Miller's Early Rufus' from G. J. Miller, Esq., Bayham Abbey Gardens, Lamberhurst, Kent.

Other Exhibits

Strawberry seedling from A. J. Mellows, Esq., Margery House, Kingswood, Surrey.

Previous Meeting

Strawberry 'Auchincruive Climax,' A.M. June 22, 1948 (voting unanimous). From the National Fruit Trials, Wisley, Surrey.

FLORAL COMMITTEE A—Mr. W. AUSTIN, in the Chair, and eleven other members present.

Awards Recommended:

Silver-gilt Banksian Medal

To Messrs. D. W. Simmons & Son, St. Albans, for an exhibit of Gloxinias.

To Messrs. John Waterer Sons & Crisp. Ltd., Twyford, for an exhibit of herbaceous plants.

Silver Flora Medal

To Burleydam Nurseries (Chester) Ltd., Wirral, for an exhibit of *Chrysanthemum maximum*, Scabious and Gaillardias.

To Messrs. T. Carlile Ltd., Twyford, for an exhibit of herbaceous plants.

To Messrs. H. Woolman Ltd., Birmingham, for an exhibit of Begonias.

Flora Medal

To Messrs. Hale & May, Cookham, for an exhibit of Roses.

To Mr. E. B. Le Grice, North Walsham, for an exhibit of Roses.

To Messrs. A. Warner & Son, Colchester, for an exhibit of Roses.

Banksian Medal

To Messrs. Hale & May Ltd., Cookham, for an exhibit of herbaceous plants.

To Messrs. M. Prichard & Sons, Ltd., Christchurch, for an exhibit of herbaceous plants.

Award of Merit

To Begonia 'Broadacre' as a greenhouse basket plant (votes 9 for, 0 against from Messrs. H. Woolman Ltd., Birmingham).

To Rose 'Ellinor Le Grice' (votes 11 for, 0 against), from Mr. E. B. Le Grice, Roseland Nurseries, North Walsham.

Preliminary Commendation

To Zonal Pelargonium 'Mercy Boorman' from T. P. Ninnim, Esq., "Chez Nous," Dorchester Road, Weybridge, Surrey.

Selected for trial at Wisley

Scabiosa caucasica 'Moerheim's Blue' from Messrs. M. Prichard & Sons, Ltd., Christchurch, Hants.

Verbena 'Lawrence Johnston' from the Director, R.H.S. Gardens, Wisley, Ripley, Surrey.

Other Exhibits

Pelargonium 'E. J. Winter' from Mr. E. J. Winter, Pilgrims Hatch, Brentwood.

Roses 'David Gold' and 'Gay Crusader' from Mr. H. Robinson, Victoria Nursery, Burbage, Hinckley, Leicestershire.

Miniature Roses from Miss Anne Ashberry, Chelmsford.

Salvias, Pelargoniums and Carnations from Messrs. P. G. Fradgley & Co., Ltd., Hook, Basingstoke.

Violas and Roses from Mr. C. A. Jardine, Feltham.

FLORAL COMMITTEE B—Lord ABERCONWAY, C.B.E., V.M.H., in the Chair, and twenty other members present.

Awards Recommended:

Gold Medal

To Messrs. W. A. Constable, Ltd., Southborough, for an exhibit of Lilies.

Silver Floral Medal

To Messrs. R. Wallace & Co., Tunbridge Wells, for an exhibit of Lilies, *Eremurus*, *Hemerocallis* and other hardy plants.

Silver Banksian Medal

To Mr. F. Street, Woking, for an exhibit of flowering shrubs.

Flora Medal

To Mr. K. W. Harle, Lower Basildon, for an exhibit of succulents.

To Messrs. Robinson, Eltham, S.E. 9, for an exhibit of rock garden plants.

Banksian Medal

To the Kew Topiary Nursery, Richmond, for an exhibit of clipped box trees.

Award of Merit

To *Allium cernuum* as a hardy, flowering herbaceous plant (votes unanimous), from Messrs. T. Hilling & Co., Chobham, Woking.

To *Jasione perennis* as a hardy, flowering herbaceous plant (votes unanimous), from the Director, R.H.S. Gardens, Wisley.

To *Lomatia tinctoria* as a half-hardy flowering shrub (votes 12 for, 2 against), from Sir Henry Price, Wakehurst Place, Ardingly, Sussex.

To *Rhododendron amagianum* as a hardy, flowering shrub (votes 14 for, 0 against), from Lord Aberconway, C.B.E., V.M.H., Bodnant, N. Wales.

Other Exhibits

Berberis polyantha, exhibited by Oliver Wyatt, Esq., Northampton.

Clethra barbinervis, *Kalmia latifolia*, Wakehurst seedling, *Rhododendron* 'Azor' var. 'A. W. Coates', *R. didymum*, exhibited by Sir Henry Price, Wakehurst Place, Ardingly.

Datura fastuosa, exhibited by E. J. Winter, Esq., Ruskin Nurseries, Pilgrims Hatch, Brentwood.

Hippeastrum × *Ackermannii*, *Rhododendron crassum*, exhibited by Lord Aberconway, C.B.E., V.M.H., Bodnant.

Hydrangea macrophylla var. *macrosepala*, *H. macrophylla* var. 'Mme. Mouilliere', *H. macrophylla* var. 'Mousseline', *H. serrata* var. *acuminata*, *H. serrata* var. 'Grayswood', *H.* × 'Wryneck', exhibited by M. Haworth-Booth, Esq., Haslemere.

Lilium aurantiacum, exhibited by R. E. Cooper, Esq., R. B. G., Edinburgh.

Rhododendron Griersonianum × 'Tally Ho', *R. Kyawi* × *diaprepes*, *R. Kyawi* × *discolor*, *R.* 'Red Cap', exhibited by the Earl of Leitrim, Mulroy, Carrigart, Co. Donegal.

Rhus cotinus var. *atropurpurea*, exhibited by Messrs. R. C. Notcutt, Ltd., Woodbridge, Suffolk.

Rosa rugosa 'Roseraie de l'Hay', exhibited by Messrs. T. Hilling & Co., Chobham, Woking.

Sambucus racemosa, exhibited by A. T. Johnson, Esq., Bulkeley Mill, Tyn-y-Groes, Conway.

ORCHID COMMITTEE—Mr. GURNEY WILSON, F.L.S., V.M.H., in the Chair, and seven other members present.

Awards Recommended:**Flora Medal**

To Messrs. Stuart Low & Co., Jarvis Brook, for a group of Orchids.

Cultural Commendation

To Mr. Walter Pierce, Orchid grower to Col. Stephenson R. Clarke, C.B., Borde Hill, Haywards Heath, for *Vuykstekeara* 'Cambria' Borde Hill var., the leading bulb of which bore two spikes with a total of 16 large flowers.

JOINT BORDER CARNATION AND PICOTEE COMMITTEE—Mr. T. HAY, V.M.H., in the Chair, and nine other members present.

Awards Recommended:**Award of Merit**

'Crimson Frills' as a show variety (votes 8 for, 0 against), shown by Messrs. Allwood Bros., Ltd., Wivelsfield Nurseries, Haywards Heath, Sussex.

'Thomas Lee,' as a show variety (votes 7 for, 1 against), shown by Mr. F. W. Goodfellow, Valley Nurseries, Albridge, Staffs.

Selected for trial at Wisley

'Downs Delight,' 'Downs Beauty' and 'Crimson Frills,' all shown by Messrs. Allwood Bros., Ltd., Haywards Heath, Sussex.

'Thomas Lee,' shown by Mr. F. W. Goodfellow, Albridge, Staffs.

Other Exhibits

'Lady Helena' (already at Wisley), shown by W. T. Moorby, Esq., Colesden Road, Chawton, Bedfordshire.

'Tavy Dawn,' shown by P. J. F. Smith, Esq., Hallowell, Bere Ferrers, South Devon.

'Allan Pullen,' shown by Mr. A. G. Pullen, The Gardens, Fundings, Wormley, Surrey.

'William Newell' (growing at Wisley), shown by Mr. F. E. Goodfellow, Valley Nurseries, Albridge, Staffs.

JOINT PERPETUAL FLOWERING CARNATION COMMITTEE—Mr. GEORGE MONRO, V.M.H., in the Chair, and ten other members present.

Exhibits

'Prudence,' shown by G. J. Miller, Esq., Bayham Abbey, Lamberhurst, Kent.

'Shredding Scarlet,' 'White Emblem,' 'Oriflamme,' 'Shredding Pink,' 'Emir,' 'Derinda,' and 'Sirdah,' all shown by A. E. Jeffs, Esq., The Croft, Iver Lane, Iver, Bucks.

JOINT DELPHINIUM COMMITTEE—Mr. T. HAY, V.M.H., in the Chair, and six other members present.

The Awards to the Delphiniums in the trials at Wisley were read and confirmed.

JOINT DIANTHUS COMMITTEE—Mr. GEORGE MONRO, V.M.H., in the Chair, and eleven other members present.

Selected for trial at Wisley

Pink 'Painted Lady,' shown by Messrs. M. Prichard & Sons, Ltd., Riverslea Nurseries, Christchurch, Hants.

JOINT ROCK GARDEN PLANT COMMITTEE—Col. F. C. STERN, F.L.S., V.M.H., in the Chair, and eight other members present.

Awards Recommended:

Award of Merit

To *Campanula* × *Birch Hybrid*, shown as *C.* × *Portenscharskyana* (*C. Portenschlagiana* × *C. Poscharskyana*) as a hardy flowering plant for the Rock Garden or Alpine House from Messrs. W. E. Th. Ingwersen, Ltd., Birch Farm Hardy Plant Nurseries, East Grinstead, Sussex. The Committee recommended that this plant be renamed.

Preliminary Commendation

Campanula × '*Lynchmere*' (*C. elatines* × *C.* (?) *cochlearifolia*) as a hardy flowering plant for the Rock Garden or Alpine House, from W. P. Panckridge, Esq., O.B.E., M.B., M.R.C.S., L.R.C.P., 97 Sussex Road, Petersfield, Hants.

Other Exhibits

Campanula mollis (A.M. 1932), from G. B. Jones, Esq., "Tregurrian," 74 Franks Avenue, New Malden, Surrey.

JULY 20, 1948

SCIENTIFIC COMMITTEE—Mr. E. A. BOWLES, M.A., F.L.S., F.R.E.S., V.M.H., in the Chair, and six other members present.

Limnanthemum indicum—Messrs. Perry of Enfield showed specimens of this tropical aquatic in a pan of water. It has floating roundish cordate leaves like those of a small *Nymphaea*, usually one on each of the offsets, together with a few spatulate leaves, and bears stalked white flowers about 1½ inches across with fringed petals like those of a *Menyanthes*. It spreads by means of runners much like those of a Strawberry, consisting of an internode about 6 or 8 inches long terminating in a bulb producing leaves and flowers as described.

Lilium formosanum—A dwarf white-flowered Lily with long linear leaves and long trumpet-shaped flowers of much substance was shown from Wisley with a plant of the original form of Price's variety for comparison. The two plants were of equal height, but the latter had fewer, rather shorter and narrower leaves and shorter flowers with purplish tinge on the back of the tube and perianth segments, the flowers of the former being wholly white. This appears to be the form now often grown as Price's variety of *L. formosanum*.

Plants for naming—Several plants for naming were referred to the Committee from Floral Committee B, including *Philadelphus insignis* and *P. Wilsonii* and *Salvia interrupta*.

Extracts from THE PROCEEDINGS OF THE ROYAL HORTICULTURAL SOCIETY

GENERAL MEETINGS

JULY 20, 1948

FRUIT AND VEGETABLE COMMITTEE—Mr. F. A. SECRETT, C.B.E., in the Chair, and twenty-three other members present.

EXHIBITS

Awards Recommended:

Gold Medal

To the Governors of St. Andrew's Hospital, Northampton, for a group of Vegetables (22 for, 1 against).

To the Rt. Hon. Lord Swaythling, Town Hill Park, West End, Southampton, for a group of Fruit (22 for, 1 against).

Selected for trial at Wisley

Black Currant 'Laxton's Giant,' from Messrs. Laxton Bros., Bedford, Ltd., Bedford.
Rhubarb 'The Sutton,' from Chas. J. Howlett, Esq., The Yews, 309 Wokingham Road, Earley, Reading.

Other Exhibits

Gooseberry 'Berkley,' from J. W. Thornhill, Esq., The Green, Uley, Glos.
Raspberry Seedling, from the Rev. W. A. Richards, Hartshill Vicarage, Nuneaton.
Raspberry x Blackberry, from the Rev. W. A. Richards, Hartshill Vicarage, Nuneaton.
Raspberry 'Newburgh,' from Mrs. Hylton-Foster, Old Dene, Dorking.

FLORAL COMMITTEE A—Mr. G. W. LEAK, V.M.H., in the Chair, and eighteen other members present.

Awards Recommended:

Silver-gilt Flora Medal.

To Messrs. Blackmore & Langdon, Bath, for an exhibit of herbaceous plants and Begonias.

Silver-gilt Banksian Medal.

To Messrs. R. C. Notcutt Ltd., Woodbridge, for an exhibit of herbaceous plants.
To Messrs. Waterer Sons & Crisp, Ltd., Twyford, for an exhibit of herbaceous plants.
To Messrs. Ed. Webb & Sons (Stourbridge) Ltd., Stourbridge, for an exhibit of Larkspurs.

Silver Flora Medal.

To Messrs. Allwood Bros. Ltd., Haywards Heath, for an exhibit of Carnations and Pinks.
To Messrs. T. Carlile Ltd., Twyford, for an exhibit of herbaceous plants.
To Messrs. M. Prichard & Sons Ltd., Christchurch, for an exhibit of herbaceous plants.

Silver Banksian Medal

To Messrs. Wm. Lowe & Son, Beeston, for an exhibit of Roses.

Flora Medal.

To Messrs. B. R. Cant & Sons, Colchester, for an exhibit of Roses.
To Messrs. Hale & May, Ltd., Cookham, for an exhibit of herbaceous plants.
To Mr. E. B. Le Grice, North Walsham, for an exhibit of Roses.
To Mr. C. Newberry, Knebworth, for an exhibit of Anemones, Iceland Poppies, etc.
To Messrs. A. Warner & Son, Buxted, for an exhibit of Roses.
To Messrs. Wheatcroft Bros., Ltd., Nottingham, for an exhibit of Roses.

Banksian Medal.

To Messrs. Hale & May, Ltd., Cookham, for an exhibit of Roses.
To Messrs. M. P. Kooper & Son, Ferndown, for an exhibit of herbaceous plants.
To Messrs. Wakeley Bros., London, for an exhibit of herbaceous plants.

Award of Merit.

To Begonia 'Diana Wynyard' as a greenhouse flowering plant (votes 18 for, 0 against), from Messrs. Blackmore & Langdon, Bath.
To Begonia 'Hercules' as a greenhouse flowering plant (votes 17 for, 0 against), from Messrs. Blackmore & Langdon, Bath.
To Rose 'Lady Belper' (votes 13 for, 4 against), from Messrs. C. Gregory & Sons, Ltd., Chilwell, Nottingham.
To Rose 'Gay Crusader' (votes 13 for, 5 against), from Mr. H. Robinson, Victoria Nursery, Burbary, Hinckley, Leicestershire.

Preliminary Commendation.

To *Dianthus* 'Daydawn' (votes 18 for, 0 against), from The Director, R.H.S. Gardens, Wisley, Ripley, Surrey.

Selected for trial at Wisley

Anthemis 'Grallach's Gold,' from Messrs. G. & R. Perry, Enfield.

Dianthus 'Daydawn,' from the Director, R.H.S. Gardens, Wisley, Ripley, Surrey.

Other Exhibits

Fuchsia fulgens Lee's variety, from C. J. Howlett, Esq., Earley, Reading.

Godetias, from Messrs. Ed. Webb & Sons (Stourbridge) Ltd., Stourbridge.

Iceland Poppies and Larkspurs, from Mr. T. Butcher, Croydon.

Pelargonium 'Margie,' from Mr. J. Marshall, Nuneaton.

Pelargonium 'Mercy Boorman' (P.C. July 6, 1948), from Mr. T. P. Ninnim, Weybridge.

Pelargonium 'Primrose Burrer' and a *Pelargonium* seedling, from Mrs. P. Burrer, Rowtown, Weybridge.

Rose 'Alain' (to be seen again), from Messrs. Wheatcroft Bros., Ltd., Nottingham.

Rose 'De Ruiter's Herald' (to be seen again), from Messrs. C. Gregory & Sons, Ltd., Chilwell, Nottingham.

Violas and Roses, from Mr. C. A. Jardine, Feltham.

FLORAL COMMITTEE B—Lord ABERCONWAY, C.B.E., V.M.H., in the Chair, and eighteen other members present.

Awards Recommended :

Silver Banksian Medal

To Messrs. Robinson, Eltham, for an exhibit of rock garden plants.

Lindley Medal

To Mr. O. E. P. Wyatt, Maidwell Hall, Northampton, for an exhibit of Lilies.

Flora Medal

To Mr. K. W. Harle, Lower Basildon, for an exhibit of succulents.

To Messrs. Hillier & Sons, Winchester, for an exhibit of flowering shrubs.

To Winkfield Manor Nurseries, Ascot, for an exhibit of rock garden plants.

Banksian Medal.

To Messrs. Burkwood & Skipwith, Ltd., Kingston, for an exhibit of flowering shrubs.

To Orchard Neville Nurseries, Baltonsborough, for an exhibit of rock garden plants.

Award of Merit

To *Clematis* 'Royal Velours' as a hardy flowering shrub (votes unanimous), from W. Bentley, Esq., Quarry Wood, Burghclere, Newbury.

To *Lilium* 'Yellow Maid' as a hardy flowering plant (votes 12 for, 0 against), from O. E. P. Wyatt, Esq., Maidwell Hall, Northampton.

To *Rhododendron* 'Leonora' (*auriculatum* × *Kyau*) as a hardy flowering shrub (votes 9 for, 0 against), from E. de Rothschild, Esq., Exbury, Southampton.

To *Rhus Cotinus atropurpurea* as a hardy flowering shrub (votes unanimous), from Mrs. Holden, Goldwell, Newbury, Berks., and Messrs. R. C. Notcutt, Ltd., Woodbridge.

To *Rosa* 'Schneezweg' (*rugosa* × *bracteata*) as a hardy flowering shrub (votes 11 for, 0 against), from Messrs. T. Hilling & Co., Chobham, Woking.

Other Exhibits

Campanula rotundifolia var., *Salvia interrupta*, exhibited by B. Crisp, Esq., Twyford. *Delphinium Staphisagria*, *Gentiana septemfida* var., *G. hascombensis*, *Lilium testaceum* × *chalcodermum maculatum*, *Philadelphus insignis*, *P. Wilsonii*, exhibited by O. E. P. Wyatt, Esq., Northampton.

Eryca vagans 'Colstoun' var., exhibited by R. D. Trotter, Esq., Leith Vale, Ockley.

Geranium pratense plenum, *Platycodon grandiflorum*, *Rhus Cotinus foliis purpureis*, exhibited by Mrs. Holden, Goldwell, Newbury.

Hypericum Moserianum, *H. patulum* var. *Forrestii*, *H. patulum* 'Hidcote' var., *H. sinense* hybrid, *Veronica* 'Spender's Seedling,' exhibited by Messrs. T. Hilling & Co., Chobham, Woking.

Lavandula nana atropurpurea, exhibited by C. Newberry, Esq., Bulls Green Nursery, Knebworth.

Lilium 'Peter Puget,' exhibited by W. Bentley, Esq., Newbury.

Limnanthemum indicum, exhibited by Messrs. Perry, Enfield.

Meliosma myriantha, exhibited by Sir Henry Price, Ardingly.

Nepeta grandiflora, exhibited by Messrs. D. W. Simmons & Son, St. Albans.

Rhododendron 'Exburyense,' exhibited by E. de Rothschild, Esq., Exbury, Southampton.

Rhus Cotinus, *R. Cotinus foliis purpureis*, exhibited by Messrs. R. C. Notcutt, Ltd., Woodbridge.

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